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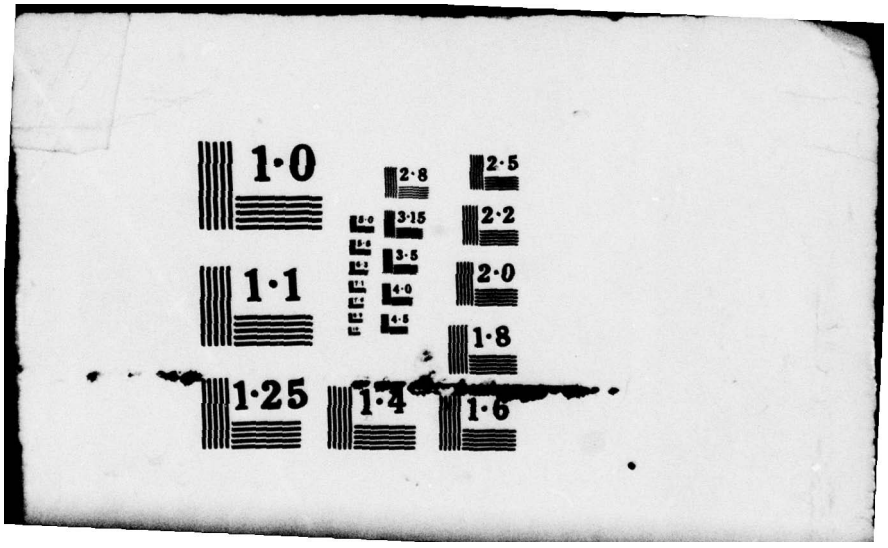
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DELAWARE RIVER BASIN

HOSENSOCK DAM

NDI NO. PA-00672
DER NO. 54-168
SCS NO. PA-424

SCHUYLKILL COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Contract No. DACW31-77-C-0022

(15)

PREPARED FOR
DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

BY

PHASE I REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam:	HOSENSOCK DAM
State & State No:	PENNSYLVANIA, 54-168
County:	SCHUYLKILL
Stream:	HOSENSOCK CREEK
Date of Inspection:	May 8, 1979

This dam was designed by the U.S. Department of Agriculture, Soil Conservation Service. The project is a flood control structure and the potential for overtopping is considered to be minimal. The spillways are considered to be adequate.

Based upon the visual inspection, past performance and existing engineering data, the dam and its appurtenant structures appear to be in good condition.

The following recommendations are presented for action by the owner:

1. That the maintenance of the slopes regarding weed, brush and tree growth and the cover of bare areas, subject to erosion, be continued on an annual basis.

2. That riprap protection be provided at the water's edge of the upstream embankment slope to minimize erosion in this area.

3. That periodic visits be made to the dam to inspect the approach to the intake structure to be sure it remains unobstructed.

4. That the wet condition in the swale at the downstream toe of the embankment at the left abutment be observed regularly to assure that its source is the sidehill and not the embankment.

PREFACE

This report has been prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

5. That the outlet control valve be operated at least once each year.

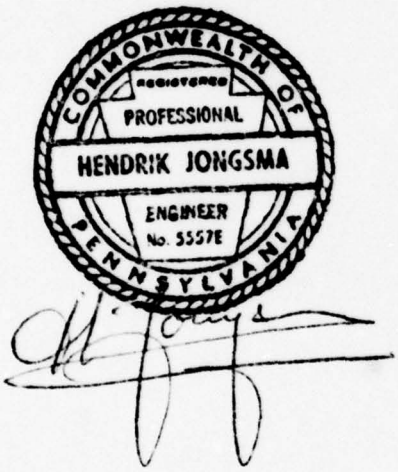
6. That a record of the maintenance activities be kept on file in the owners office.

7. That a formal surveillance and downstream warning system be developed for use during periods of prolonged or heavy rainfall.

SUBMITTED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

DATE: July 13, 1979



APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

DATE 28 July 1979

OVERVIEW

HOSENSOCK DAM

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

HOSENSOCK DAM

NDI-ID NO. PA-00672
DER-ID NO. 54-168
SCS NO. PA-424

SECTION I - PROJECT INFORMATION

1.1 GENERAL

A. Authority

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspections of dams throughout the United States.

B. Purpose

The purpose is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

ABSTRACT

The Hosensock Dam is a zoned earthfill dam designed by the U.S.D.A. Soil Conservation Service for flood control purposes. The principal features of the dam include the embankment, a concrete drop inlet type primary spillway and an emergency spillway section at the right abutment. The emergency spillway is constructed as an earth structure with the overflow section about six feet lower than the crest of the main embankment.

The embankment crest design elevation is 1126 and its length is 795 feet from the left abutment to the emergency spillway. The height of the dam is 35 feet above the streambed. ~~Refer to Appendix F, Plate III and VI.~~ A two foot thick blanket drain is located under the downstream slope of the embankment. This blanket is composed of a filter material and is about 450 feet by 40 feet in plan dimension. ~~Refer to Appendix F, Plate V.~~

The primary spillway is a reinforced concrete riser located at the upstream toe of the embankment near the center of the dam. A pond

ABSTRACT

drain is located 18.5 feet upstream of the spillway structure. An 18-inch cast iron pipe connects the submerged drain intake to the spillway unit. This pipe is controlled by an 18-inch valve gate at the spillway. The main discharge from the reservoir spills over the weir, into the spillway chamber then discharges through the base of the embankment, by means of a 30-inch diameter concrete water pipe, to the outlet channel at the toe of the downstream slope. There is no control on the 30-inch pipe. Refer to Appendix F, Plate VI. The 30-inch diameter outlet pipe is fitted with four concrete cutoff collars and is resting on a reinforced concrete cradle.

The design slopes for the embankment were 2.5H to 1V upstream and 2H to 1V downstream. These slope ratios were confirmed by land survey during this inspection.

B. Location: Ryan Township, Schuylkill County
U.S.G.S. Quadrangle, Delano, PA
Latitude: 40°-48.8', Longitude: 76°-03.3'
refer to Appendix F, Plates I and II

C. Size Classification: Small (Height 35 feet, Volume 613 acre-feet)

D. Hazard Classification: High (See Section 3.1.E)

E. Ownership: County of Schuylkill
Schuylkill Court House
Pottsville, PA 17901

F. Purpose: Flood Control

G. Design and Construction History

The Hosensock Dam was designed by the U.S.D.A., Soil Conservation Service as Project PA-424 in 1958. The permit to construct the dam was issued to the Commissioners of Schuylkill County by Commonwealth of Pennsylvania, Water and Power Resources Board on December 16, 1959. Construction was started on June 6, 1960, and was completed in November 1960. After final inspection by the Commonwealth in April 1961, permission was granted to store water in the reservoir. The project was constructed by Wright Giffin, LeRaysville, Pennsylvania.

Records of construction are limited to tabulations of items of work and the percent completed at the time of the submission of each report. There are no records of any construction problems or modifications to the project in the PennDER or the SCS (designer) files.

Refer to Appendix F for selected design drawings and Appendix E for photographs taken during this inspection.

H. Normal Operating Procedure

The Hosensock Dam was designed as a flood control structure to protect the downstream areas of the Hosensock Creek during high intensity storms. There is no formal operating procedures for this facility aside from assuring that minimum flow requirements are met and providing maintenance of the embankment slopes and outlet facilities.

The drain valve is left partially open for low flow control. No extraordinary maintenance is required.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files	2.2
Computed for this report	2.1
Use	2.1

B. Discharge at Dam Site (cubic feet per second)
See Appendix C for hydraulic calculations

Maximum known flood, June, 1972 Estimated pool elevation 1111.0	90
Pool drain outlet at pool Elev. 1,093.0	12
Outlet works at pool level Elev. 1,102.0 (sediment pool)	17
Principal Spillway, pool level Elev. 1,120.7 (crest of emergency spillway)	108
Total of both spillways, pool level Elev. 1,124.0 (design flood)	2,680
Total of both spillways, pool level Elev. 1,126.0 (top of dam)	5,450

C. Elevation (feet above mean sea level)

Top of dam	1,126.0
Emergency spillway crest (earth channel)	1,120.7
Principal spillway crest (drop inlet)	1,103.0

Sediment pool orifice invert	1,099.8
Upstream portal invert (30-inch diameter pipe)	1,091.0
Downstream portal invert (30-inch diameter pipe)	1,089.0
Streambed at centerline of dam - estimate	1,091.0
Maximum tailwater for design flood - estimate	1,095.0

D. Reservoir (miles)

Length of sediment pool	0.2
Length of maximum pool	0.5

E. Storage (acre-feet)

Sediment pool (Elev. 1099.8)	20
Emergency spillway crest (Elev. 1,120.7)	399
Top of dam (Elev. 1,126.0) estimate	613

F. Reservoir Surface (acres)

Top of dam (Elev. 1,126.0)	45
Emergency spillway crest (Elev. 1,120.7)	36
Sediment pool (Elev. 1,099.8)	4

G. Dam

For selected drawings refer to Appendix F, Plates III through VI.

Type: Zoned Earthfill.

Length: 795 feet.

Height: 35 feet.

Top Width: 14 feet.

Side Slopes: Upstream - 2.5H to 1V
Downstream - 2H to 1V

Zoning: Compacted fill core with semi-compacted fill shell.

Refer to Appendix F, Plate III for definitions.

Cutoff: None.

Grout Curtain: None.

Blanket Drain: 2 foot thick - refer to Appendix F, Plate V for location.

H. Outlet Facilities

The principal spillway is a concrete drop inlet structure with inside dimensions of 2.5 feet by 6.0 feet, located near the upstream toe of the embankment. Water enters the structure by flowing over the two 6.0-foot sides. From the bottom of the structure, water flows through a 164-foot-long 30-inch inside diameter, reinforced concrete pipe to the downstream side of the embankment where it is discharged to the stream channel after passing through a 15-foot by 30-foot plunge pool about 3 feet deep.

The two ends of the above structure support an 8-foot by 11.5-foot horizontal concrete slab which serves as an anti-vortex device and also prevents damage from ice. The underside of the horizontal slab is 1.5 feet above the top of the 6-foot sides of the tower so water enters the tower through two openings, each measuring 6.0 feet by 1.5 feet.

The structure also has a single orifice measuring 1.5 feet by 2.0 feet which maintains the level of the permanent sediment pool.

All of the above features are uncontrolled and are sized to provide the required amount of floodwater detention.

A low-level, gated 18-inch cast-iron pipe can be used to admit water to the inlet structure and thus drain the sediment pool.

I. Emergency Spillway

Type: Uncontrolled, sod-lined broad-crested weir and channel cut through the rock bank at the right end of the embankment.

Length of weir: The bottom width is 160 feet and the side slopes are 1.5H to 1V on the right and 2H to 1V on the left.

Crest elevation: 1,120.7 (5.3 feet below top of dam). This spillway receives no flow until the pool reaches the level of a 100-year flood.

Upstream channel: The spillway approach channel is 400 feet long and rises on a slope of about 9.4 percent. The crest is level for a distance of 10 feet. The channel curves sharply to the left as it passes around the end of the embankment.

Downstream channel: After passing the level 10-foot crest, the channel has a rather flat downstream slope for the first 20 feet, and then steepens for the final 120 feet. At the end of the excavated 130-foot section described above, water would be discharged to the undisturbed wooded hillside and descends an additional 25 feet to Hosensock Creek at a point about 200 feet downstream from the toe of the embankment. The downstream channel is straight.

J. Regulating Outlets

See Section 1.3.H.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The engineering design data for this dam are found in two principal documents: a design report, and the construction drawings.

The design report is a comprehensive documentary report with hydrologic and hydraulic data, soils investigation information including field and laboratory test results, slope stability analyses and design calculations and sketches. This report and full size drawings are in the PennDER files. Reduced drawings are found in the U.S.D.A. Soil Conservation files. Refer to Appendix F for selected design drawings.

2.2 CONSTRUCTION

The information on the construction of the dam is limited to progress reports which list the major items of work and the percent complete at the time of the submission of the report. There are no records of any construction problems.

One copy of the project specifications is in the PennDER files.

2.3 OPERATION

There are no records of operation with the owner, PennDER or SCS files. The purpose of the facility is flood control and except for maintaining minimum flow in the Hosensock Creek below the dam, there is no operational procedure.

2.4 EVALUATION

A. Availability

The design report, construction drawings, and specifications are available in the PennDER files. Reduced size drawings are available in the S.C.S. (Designer) files.

B. Adequacy

The available engineering data is considered sufficiently adequate for evaluating the design of the dam.

C. Operating Records

This dam is a flood control structure and there are no operating records maintained by the owner.

D. Post Construction Changes

There have been no modifications to this facility since the completion of construction in 1960.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of the Hosensock Dam is good. Conditions which need attention include the continued maintenance of the embankment slope cover and maintaining an unobstructed flow for minimum requirements at the principal spillway inlet. Refer to Appendix A for visual check list and Appendix E for photographs taken during this inspection.

B. Embankment

The visual inspection of the embankment did not find any evidence of structural distress or seepage. The water surface level, on the day of the inspection was 1099.8+ (26± feet below the crest of the embankment).

The embankment slope surfaces are reasonably uniform. The upstream slope cover is light growth of weeds, some grass with some bare spots. The downstream slope is covered with thin grass and weeds with several bike trails running from the bottom to the top of the slope. On the crest of the dam, there is a worn foot path and some small amounts of grass.

Water was observed in the swale at the downstream toe of the embankment at the left abutment. This water appears to be coming from the sidehill rather than from the embankment.

A surveyed profile along the crest of the dam reflects the results of the camber built into the surface. Finished design elevation is 1126.0; the minimum survey elevation was 1126.5. The upstream and downstream slopes were found to be essentially as designed. Refer to Appendix A, Plates II and III for survey information and Appendix E for photographs of existing facilities.

C. Appurtenant Structures

The appurtenant structures for this dam include the principal spillway, outlet conduit, pond drain and emergency spillway.

The principal spillway is a concrete drop inlet structure. It has three levels of intake of which only one is controlled. The low level intake is defined on the design drawings as the pond drain. Refer to Appendix F, Plate VI. Discharge through this inlet is controlled by an 18-inch valve. The owner's representative indicated that the valve

is always partially open to allow the minimum downstream flow to be maintained. According to the owner's representative, this valve has not been operated during the past seven years. The invert at the entrance to the structure is 1091.8. The next inlet is an 18-inch by 24-inch uncontrolled orifice at elevation 1099.8. The prime inlet is the weir crest at elevation 1103. Refer to Appendix F, Plate VI. The principal spillway appears to be in good condition. Water was discharging from the 30-inch diameter outlet conduit into the outlet plunge pool. The exposed portion of the concrete pipe appeared to be in good condition.

The emergency spillway is covered with a firm stand of grass. It is in very good condition and it appears that erosion will not be a problem in the event of flood flow through this area.

D. Reservoir Area

This project was designed as a flood control structure. The reservoir is seldom filled and the water level fluctuates in response to rain storms. This fluctuation causes some erosion at the waterline around the reservoir. Above the water, the reservoir area is partially grassed and partially wooded.

E. Downstream Channel

The downstream channel is the continuation of Hosensock Creek. After leaving the outlet channel, the flow continues in the creek flowing through an amusement park (Lakewood Park) beginning a short distance downstream from the dam. This park uses the water from the creek to create a swimming area for park patrons. A breach in the Hosensock Dam would endanger more than a few lives in this area; therefore, the hazard category for this dam is "High".

3.2 EVALUATION

On the basis of the observed conditions of the embankment, outlet structure and emergency spillway, the overall rating of this dam is good.

Continued maintenance of the embankment slopes, and emergency spillway area are measures to be considered at this time. This includes placement of riprap on the upstream embankment slope at the water's edge to minimize erosion.

The control valve on the drain pipe should be operated annually to insure its use in the event of an emergency.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

This dam, being a flood control structure does not require special operational procedures aside from regular maintenance of the control of brush, heavy weeds, trees, etc., on the slope and the emergency spillway and the control of minimum flow in the Hosensock Creek below the dam.

4.2 MAINTENANCE OF THE DAM

As indicated above, the maintenance of the dam involves the control of growth on the slopes and in the emergency spillway area and seeding of bare spots to control erosion.

4.3 MAINTENANCE OF OPERATING FACILITIES

The intake structure or principal spillway has one operating valve. This valve controls the reservoir drain or blowoff facility and is left in a partially open condition to assure minimum flow in Hosensock Creek below the dam. This valve has not been operated in over seven years.

The other intake ports are uncontrolled and need no special attention except to maintain a clear unobstructed approach.

4.4 WARNING SYSTEM

There is no formal surveillance or downstream warning system in operation for this facility.

4.5 EVALUATION

The maintenance of this facility is good. This conclusion is based upon the general appearance of the dam.

Attention should be given to the covering and maintenance of bare spots on the slopes of the embankment, keeping the approaches to the intake structure clear and unobstructed and operating the control valve at least once each year.

A formal surveillance and downstream warning system should be developed for use during periods of prolonged or heavy rainfall and other emergencies.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

The hydrologic and hydraulic analyses available from PennDER were complete and followed the methods outlined in the Engineering Handbook and the Hydrology Guide of the U.S. Department of Agriculture, Soil Conservation Service. The design was prepared by that organization.

The principal spillway was designed for a 100-year frequency storm having 4 inches of runoff, 1,150 cfs peak inflow and 98 cfs of peak outflow.

The emergency spillway was designed for a 1.25 x 6-hour condition III storm having 11.5 inches of runoff, 3,180 cfs peak inflow, and 2,765 cfs of peak outflow. This would provide 2.0 feet of freeboard.

Top of dam was designed for a 2.5 x 6-hour condition II storm having 21.6 inches of runoff, 5,740 cfs of peak inflow, and 5,530 cfs of peak outflow.

B. Experience Data

This dam was built in 1960 with financial and design help from the U.S. Soil Conservation Service. It is owned by Schuylkill County.

It is probable that the greatest flood since 1919 occurred on August 18, 1955. The flow at the dam site for this storm is estimated to have been about 700 cfs. (This was prior to the construction of the dam). Refer to Appendix C for hydrologic data.

A representative of the owner reported that the 1972 flood reached a stage about "six feet over the box". This would be an elevation of about 1,111 feet or a discharge of about 90 cfs. The project passed that flood without damage. There has never been any flow over the emergency spillway.

C. Visual Observations

On the date of the inspection, no conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event, until the dam is overtopped.

D. Overtopping Potential

Hosensock Dam has a total storage capacity of 613 acre-feet and an overall height of 35 feet above the streambed, both referenced to the top of the dam. These dimensions indicate a size classification of "Small". The hazard classification is "High" (Refer to Section 3.1.E).

In accordance with the Corps of Engineers guidelines, the recommended Spillway Design Flood (SDF) for a dam having the above classification is from 1/2 PMF to the full PMF. The SDF used for the design of the spillways for this dam was based on 21.6 inches of runoff. This SDF approximates the full PMF. Therefore, the potential for overtopping the embankment is considered minimal.

E. Spillway Adequacy

The spillways are considered to be adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection did not observe or detect any signs of embankment instability. The original design report indicates a minimum factor of safety of 1.52 for full drawdown condition. The slopes were surveyed to be virtually the same as designed. Refer to Appendix A, Plate A-III.

2. Appurtenant Structures

The emergency spillway was also found to be in very good condition. Conditions of instability were not observed. The inlet drop structure, referred to as the principal spillway was in sound condition. There were no signs of distress. The outlet pipe is in good condition and the plunge pool appears to be stable.

B. Design and Construction Data

The information contained in the design report indicate that this dam was designed using current and acceptable engineering procedures. Stability calculations are available in the report in support of the design. A complete set of construction drawings and specifications are in the file for record. These documents define the construction requirements of the dam.

C. Operating Records

There are no records of high or flood flows for this dam. The owner's representative indicated that the June 1972 storm caused a water level near elevation 1111.0. This is about 9.5 feet lower than the crest of the emergency spillway and about 15 feet below the crest of the embankment.

D. Post Construction Changes

There have been no changes or modifications made to this dam since its completion in 1960.

E. Seismic Stability

This dam is located in Seismic Zone 1 and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection, the review of the design report, construction drawings and specifications, and the correspondence in the PennDER files indicate that this is a well designed facility in good condition. The inspection did not detect any signs of instability or seepage that could be considered to endanger the safety of the dam.

Present maintenance of the embankment slopes, maintaining clear approach to the inlet structure and regular operation of the drain control valve are items to be considered in order to assure the continued satisfactory performance of the dam.

The capacity of the spillways approximate that required for the full PMF. They are therefore considered to be adequate.

B. Adequacy of Information

The design information contained in the files are considered adequate for making a reasonable assessment of this dam. The conclusions reached that this dam is adequately designed and constructed is supported by the visual appearance of the entire facility.

C. Urgency

The recommendations presented below should be implemented as soon as possible.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

A. Facilities

There are no special recommendations for the overall facilities. Recommendations are related to Operation and Maintenance Procedures.

B. Operation and Maintenance Procedures

The following operations are presented for consideration of the owner:

1. That the maintenance of the slope regarding weed, brush and tree growth and the cover of bare areas, subject to erosion, be continued on an annual basis.

2. That riprap protection be provided at the water's edge of the upstream embankment slope to minimize the erosion in this area.

3. That periodic visits be made to the dam to inspect the approach to the intake structure to be sure it remains unobstructed.

4. That the wet condition in the swale at the downstream toe of the embankment at the left abutment be observed regularly to assure that the source is the sidehill and not the embankment.

5. That the outlet control valve be operated at least once each year.

6. That a record of the maintenance activities be kept on file in the owners office.

7. That a formal surveillance and downstream warning system be designed for use during periods of prolonged or heavy rainfall.

APPENDIX A

CHECKLIST OF VISUAL INSPECTION REPORT

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 54-168 NDI NO. PA-00672

NAME OF DAM Hosensock Dam HAZARD CATEGORY High

TYPE OF DAM Zoned Earthfill

LOCATION Ryan TOWNSHIP Schuylkill COUNTY, PENNSYLVANIA

INSPECTION DATE 5/8/79 WEATHER Sunny - Warm TEMPERATURE 70's

INSPECTORS: R. Houseal (Recorder) OWNER'S REPRESENTATIVE(s):

A. Bartlett Hugh Subrine

R. Steacy

H. Jongsma

NORMAL POOL ELEVATION: 1099.8(Orifice) AT TIME OF INSPECTION:

BREAST ELEVATION: 1126.0 POOL ELEVATION: 1103.0+

Principal
SPILLWAY ELEVATION: 1103.0 TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: 1972 about 6' over top of upstream control.

GENERAL COMMENTS:

The dam as a whole has a good appearance. The major effort in the operation and control of this dam is the maintenance involved in keeping the slopes free of heavy brush growth.

This is a flood control dam, with an amusement park immediately downstream of the dam.

NDI NO. PA-00 672

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None on top. None evident on upstream or downstream slopes.
B. UNUSUAL MOVEMENT BEYOND TOE	None evident.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	Embankment slopes reasonably uniform on surface. Some slight erosion at toe of upstream slope due to fluctuating water level in reservoir.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal alignment appears good. Curved section on right as embankment approaches emergency spillway section. Refer to profile for vertical information.
E. RIPRAP FAILURES	Riprap reported to have been originally shale and sandstone which has almost completely disintegrated. This not indicated on the drawings.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Abutments appear to be sound.
G. SEEPAGE	Water in swale at toe of downstream toe at the left abutment. Appears to be coming from sidehill rather than the embankment.
H. DRAINS	None.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Top cover: thinly grassed with bare foot path. Upstream: light weeds, some grass, some bare areas. Downstream: thin grass and weed cover, few bike trails.

NDI NO. PA-00 672

VISUAL INSPECTION
OUTLET WORKS

	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	Concrete enclosed intake structure as the principal spillway. Access is through a metal cover on top of structure. Cover bolted could not observe inside. The structure is situated right at the upstream toe of the embankment. Some large submerged logs at intake screen. Should be removed.
B. OUTLET STRUCTURE	30-inch diameter concrete pipe discharges directly into the natural stream channel. This discharge is from the principal spillway strucutre - good condition.
C. OUTLET CHANNEL	The outlet channel is the natural stream. Concrete obstruction about 100 yards downstream. Plunge pool at end of pipe with large rocks for erosion control.
D. GATES	Valve in the upstream control - not operated in over 7 years.
E. EMERGENCY GATE	Same as "D" above, not accessible during pool levels higher than 4.1 feet above normal pool.
F. OPERATION & CONTROL	Maintenance of slopes and immediate downstream channel.
G. BRIDGE (ACCESS)	None.

NDI NO. PA-00 672

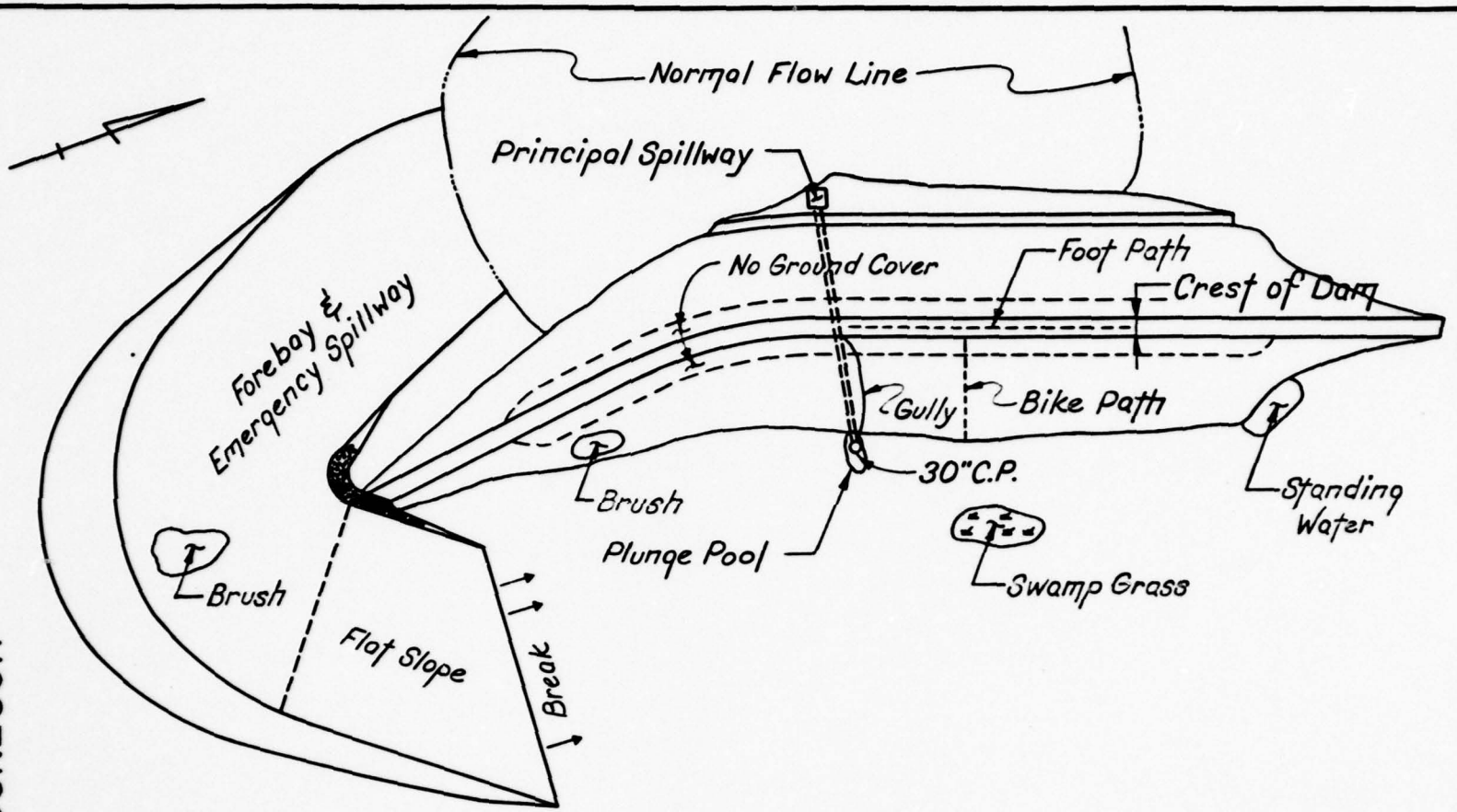
VISUAL INSPECTION
SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Small reservoir discharges directly into the principal spillway structure.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	There is a concrete drop structure near the center of the dam at the toe of the upstream slope of the embankment. This structure is identified as the principal spillway. An emergency spillway is located at the right abutment of the dam embankment. This spillway is cut into natural ground and is grassed. Condition of both is good.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	Natural stream below outlet pipe from principal spillway.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	Not operated over past 7 years on principal spillway for drawdown purposes. None on emergency spillway.
F. CONTROL & HISTORY	None, probably maximum lake elevation about 6 feet above concrete spillway intake.

NDI NO. PA-00 672

VISUAL INSPECTION

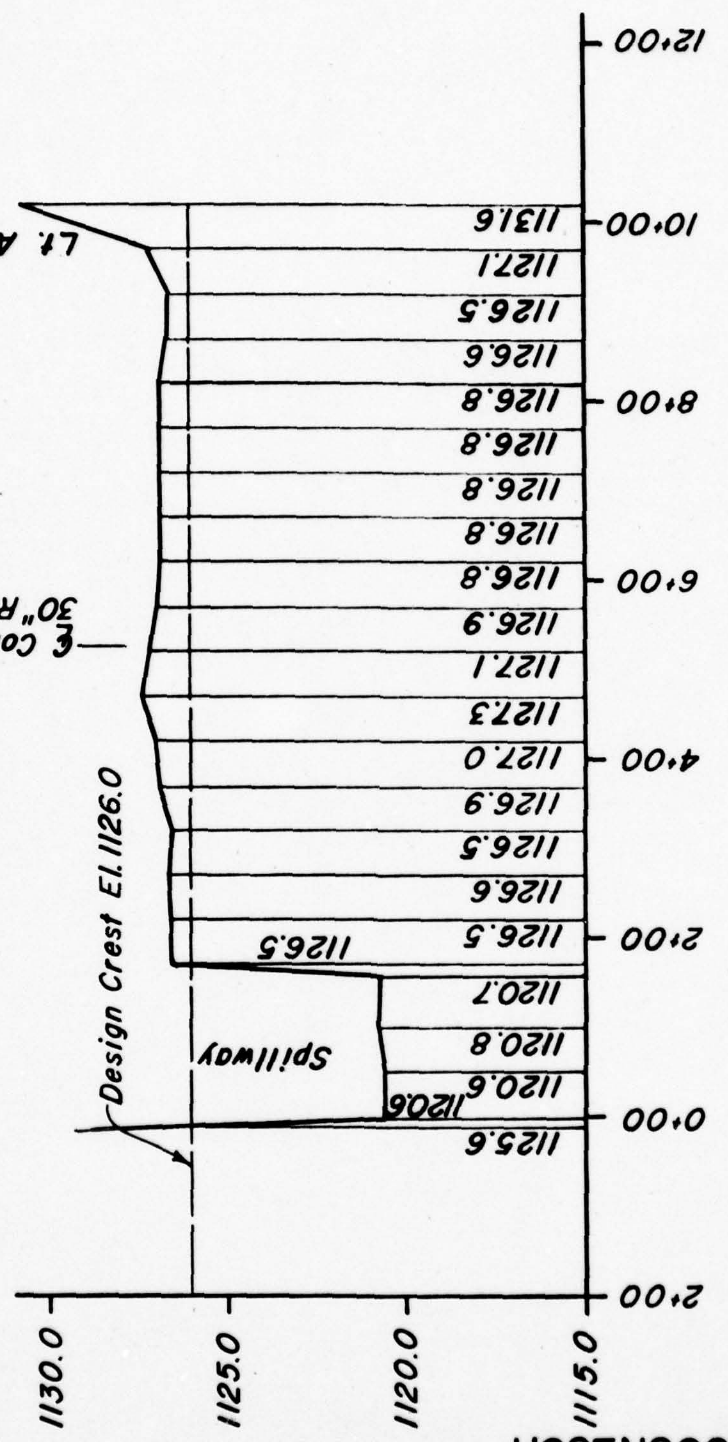
	OBSERVATIONS AND REMARKS
INSTRUMENTATION Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
RESERVOIR Slopes	Some grassed, mostly wooded.
Sedimentation	None reported - provided for in the design.
Watershed Description	Partially wooded, partially developed.
DOWNSTREAM CHANNEL Condition	Through amusement park and two small dams, a railroad embankment along Route 54 prevents serious damage beyond that embankment.
Slopes	Relatively flat.
Approximate Population	Amusement Park - varies.
No. Homes	Amusement Park.



PLAN
HOSENSOCK CREEK DAM

Surveyed 5/8/79

HOSENSOCK CREEK DAM
PA.672
INSPECTION SURVEY
PLATE A-I

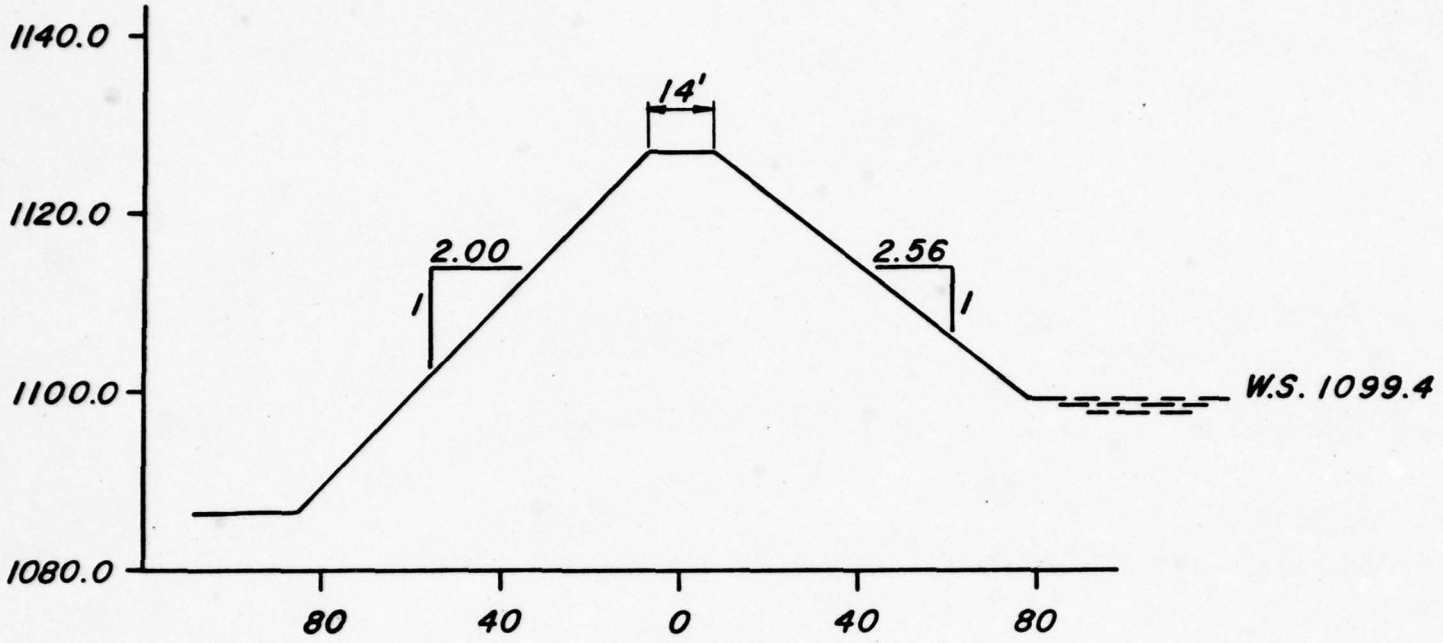


Surveyed 5-8-79

DAM ℄ PROFILE
LOOKING UPSTREAM

HOSENSOCK CREEK DAM
PA.-672
INSPECTION SURVEY

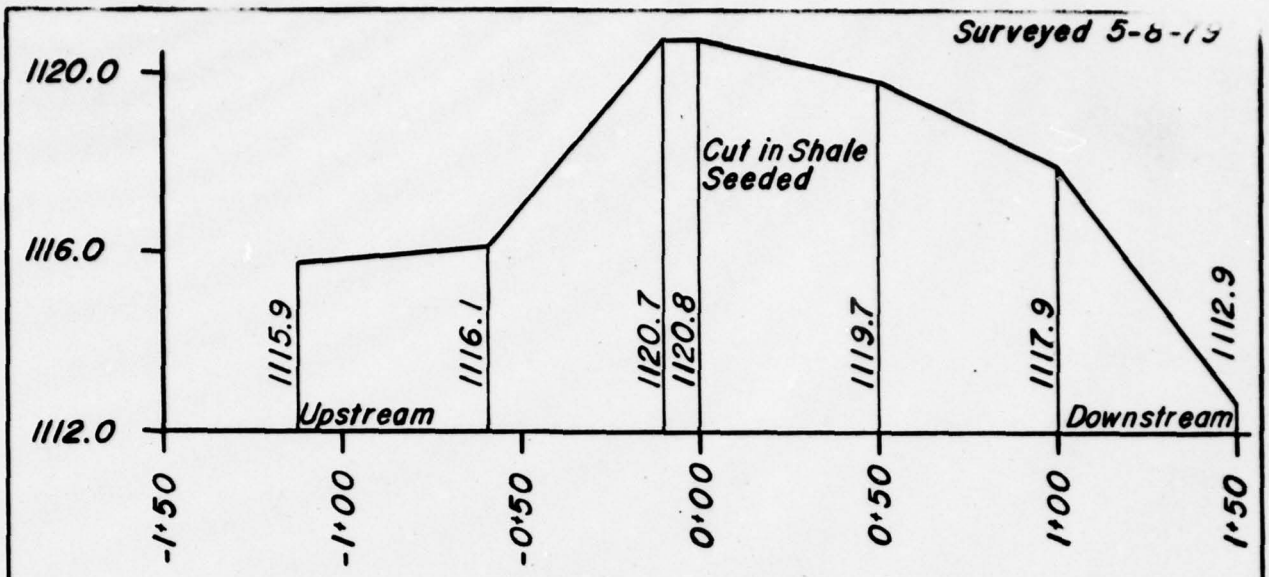
PLATE A-II



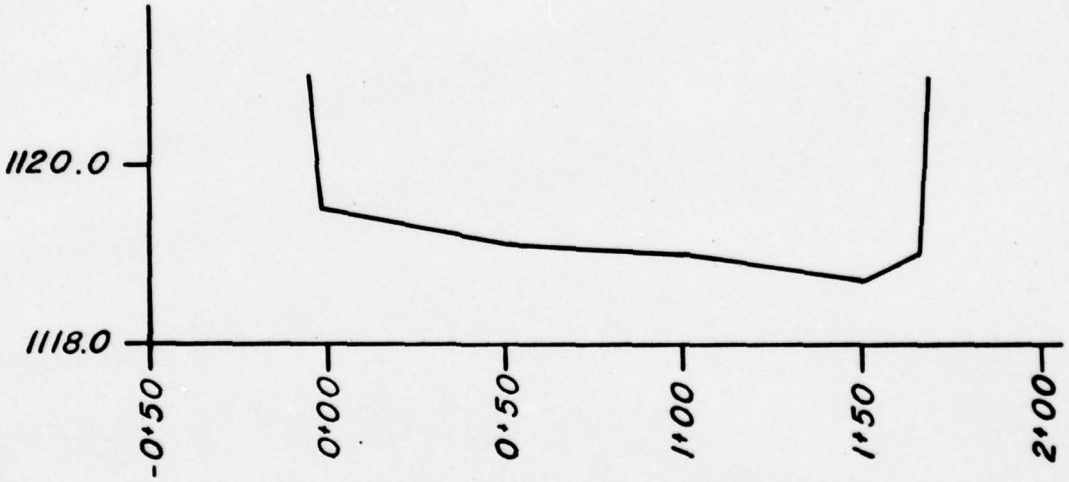
EMBANKMENT SECTION

HOSENSOCK CREEK DAM
PA.-672
INSPECTION SURVEY
PLATE A-III

Surveyed 5-8-79



SPILLWAY PROFILE STA. 1+00
ON DAM PROFILE



X-SECTION-SPILLWAY APPROACH CHANNEL
ON LINE OF UPSTREAM FACE OF DAM

HOSENSOCK CREEK DAM
PA.-672
INSPECTION SURVEY

PLATE A-IV

APPENDIX B

CHECKLIST OF ENGINEERING DATA

CHECK LIST
ENGINEERING DATA

PA DER # 54-168 NDI NO. PA-00672

NAME OF DAM HOSENSOCK DAM

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle, Delano, PA See Plate II, Appendix F
CONSTRUCTION HISTORY	There are no records of construction except an account of progress and percent of completion.
GENERAL PLAN OF DAM	Included in the construction drawings.
TYPICAL SECTIONS OF DAM	Included in the construction drawings.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	Refer to design report and construction plans in the PennDER files for detailed information.

NDI NO. PA-00 672

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	Design Report in the PennDER file.
DESIGN REPORTS	Design Report is in the file.
GEOLOGY REPORTS	Geologic information is part of the design report.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Slope stability study summary is included in the design report. Hydrologic, hydraulic and structural criteria and computations are in the report.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	Laboratory soil test information and summaries are in the design report. Test pit information on soils is included on the design drawings.
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Borrow materials are identified in the design report.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None.
HIGH POOL RECORDS	None.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None.
MAINTENANCE & OPERATION RECORDS	None.
SPILLWAY PLAN, SECTIONS AND DETAILS	Refer to the Construction Plans and Appendix F of this inspection report.

NDI NO. PA-00 672

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	No operating equipment.
CONSTRUCTION RECORDS	None.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	S.C.S. Inspection Reports on Operation and Maintenance.
MISCELLANEOUS	

NDI NO. PA-00 672

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Woodlands.

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 1103.1 20 Acre-Feet

TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev 1126.0 613 Acre-Feet

MAXIMUM DESIGN POOL: Elev. 1124.0

TOP DAM: Elev. 1126.0

SPILLWAY:

a. Elevation Principal - 1103.0 Emergency - 1120.7

b. Type Drop inlet concrete weir Grass-Turf

c. Width 12 inches 20 feet

d. Length 12' (6' each side of structure) 160 feet

e. Location Spillover In drop inlet Right abutment

f. Number and Type of Gates None None

OUTLET WORKS:

a. Type Concrete drop structure.

b. Location Upstream toe of embankment near center of dam.

c. Entrance inverts Drain: 1091.8 - Orifice: 1099.8 - Weir: 1103.0

d. Exit inverts 30" diameter concrete pipe for all intake: 1089.0

e. Emergency drawdown facilities Pool drain outlet with control valve.

HYDROMETEOROLOGICAL GAGES:

a. Type None.

b. Location

c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 5,450 cfs.

APPENDIX C

HYDROLOGY AND HYDRAULIC CALCULATIONS

SUBJECT Hoscensock Creek Dam - I.D. No. 612

COMPUTED BY RES DATE May 10, 1979 CHECKED BY JWJ.

Estimate of Maximum Known Flood

Hoscensock Creek flows into Pine Creek, which joins Little Schuylkill River upstream from the Tamaqua USGS gage

Flood of record (1919-1977) at Tamaqua 7,790 cfs, Aug. 18, 1955. Drainage Area = 42.9 sq. mi.

$$\left(\frac{7.1}{42.9}\right)^{.8} \times 7790 = 700 \text{ cfs}$$

Dam Discharge Rating

Pool Drain - 18-inch cast-iron pipe, 20' long leading to upstream side of outlet tower. 18-inch gate valve inside tower is normally shut. Invert elevation 1091.0. From tower water flows through 30-inch I.D. reinforced concrete pipe, 164 feet to downstream toe of dam.

Estimate flow using $n = 0.012$, $d = 1.5$

$H = 1093.0 - 1091.75 = 1.25$ ft.

$L = 20$ ft.

$$H = \left[\frac{2.5204(1+K_e)}{D^4} + \frac{466.18 \times n^2 \times L}{D^{16/3}}\right]\left(\frac{Q}{10}\right)^2$$

$$1.25 = \left[\frac{2.5204 \times 1.5}{(1.5)^4} + \frac{466.18 \times (.012)^2 \times 20}{1.5^{16/3}}\right]\left(\frac{Q}{10}\right)^2$$

$$1.25 = [0.747 + 0.154]\left(\frac{Q}{10}\right)^2$$

$$\frac{1.25}{.901} = \left(\frac{Q}{10}\right)^2 = 1.387$$

$$\frac{Q}{10} = 1.178, \quad Q = 12 \text{ cfs}$$

SUBJECT Hoosenack Creek Dam - I.D. No. 672

COMPUTED BY REL DATE May 10, 1979 CHECKED BY JDPJr

Dam Discharge Rating

Sediment Pool Orifice

Sediment pool elevation is regulated by a fixed orifice in upstream face of outlet tower. Opening is 2.0 ft. wide and 1.5 ft. high, and has an invert elevation of 1099.8 ft.

Estimate Flow using $C = 0.6$

$a = 2 \times 1.5 = 3.0 \text{ ft}^2$

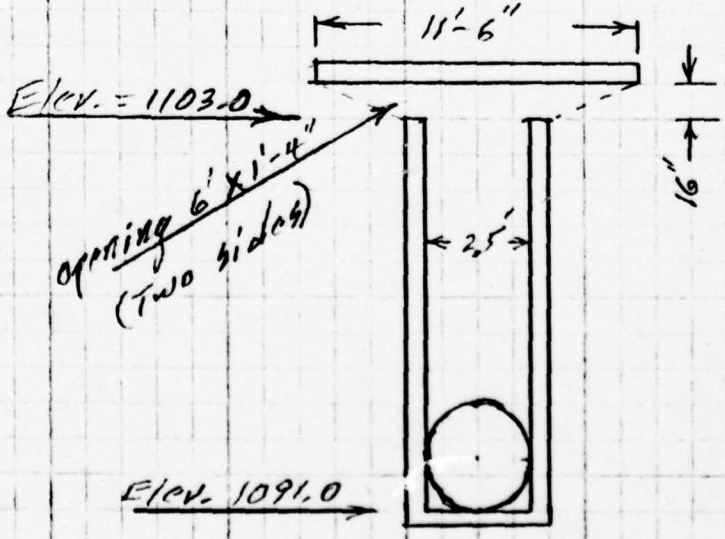
$h = 1103.0 - 1099.8 - 0.75 = 2.45$

$Q = Ca\sqrt{2gh} = 0.6 \times 3.0 \times \sqrt{64.3 \times 2.45}$

$= 22.6 \text{ cfs}$ at pool stage 1103.0

Principal Spillway

The Principal Spillway is a reinforced concrete drop inlet with inside dimensions of 2.5 ft by 6.8 ft. The 2.5-ft sides are solid and support an 8 ft. x 11.5 ft. concrete cover slab.



Section looking downstream
Not to scale.

PROJECT Dam Investigation SHEET NO. 2 OF 6

SUBJECT Hasensack Creek Dam, ID No. 672

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJP Jr.

Principal Spillway - Cont.

Estimate pool level for 90 cfs

Orifice

$Q = C a \sqrt{2gh}$ $\quad C = 0.6$

$a = (12 \times 1.333) + (2 \times 1.5) = 19.0$

$90 = 0.6 \times 19 \times \sqrt{64.3\,h}$

$\sqrt{64.3\,h} = \dfrac{90}{0.6 \times 19} = 7.89$

$64.3\,h = 62.3 \qquad h = 0.97$ ft.

Pipe $H = \left[\dfrac{2.5204\,(1 + K_T)}{D^4} + \dfrac{466.18\,n^2 L}{D^{16/3}}\right]\left(\dfrac{Q}{10}\right)^2$

$D = 2.5$, $K_e = 0.5$, $K_b = 1.0$, $K_T = 1.5$

$L = 164$ ft, $n = 0.012$, $Q = 90$

$H = \left[\dfrac{2.5204 \times 2.5}{(2.5)^4} + \dfrac{466.18 \times (0.012)^2 \times 164}{(2.5)^{5.333}}\right]\left(\dfrac{90}{10}\right)^2$

$= \left[0.1613 + 0.0831\right] \times 81 = 19.80$

Pool (90 cfs) $= 1089.0 + 1.25 + 0.97 + 19.80 = 1111.0$

Pool level for 100 cfs

Orifice

$100 = 0.6 \times 19 \times \sqrt{64.3\,h}$

$\sqrt{64.3\,h} = \dfrac{100}{0.6 \times 19} = 8.77$

$h = 1.20$ ft.

PROJECT: [illegible] SHEET NO. 7 OF [illegible]

SUBJECT Hoosenack Creek Dam, ID No. 672

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJPJr

Principal Spillway - Cont.

Pipe (100 cfs)

$$H = [0.2444]\left(\frac{100}{10}\right)^2$$

$$= 24.44 \text{ ft.}$$

Pool / 100 cfs $= 1089.0 + 1.25 + 1.20 + 24.44 = 1115.9$

Pool level for 110 cfs

Orifice

$$110 = 0.6 \times 19 \times \sqrt{64.34}$$

$$\sqrt{64.34} = \frac{110}{0.6 \times 19} = 9.65$$

$$h = 1.45 \text{ ft.}$$

Pipe (110 cfs)

$$H = [0.2444]\left(\frac{110}{10}\right)^2$$

$$= 29.57 \text{ ft.}$$

Pool / 110 cfs $= 1089.0 + 1.25 + 1.45 + 29.57$

$= 1121.3'$

Pool level for 80 cfs

Orifice $80 = 0.6 \times 19 \times \sqrt{64.34}$

$$\sqrt{64.34} = \frac{80}{0.6 \times 19} = 7.02 \qquad h = 0.77'$$

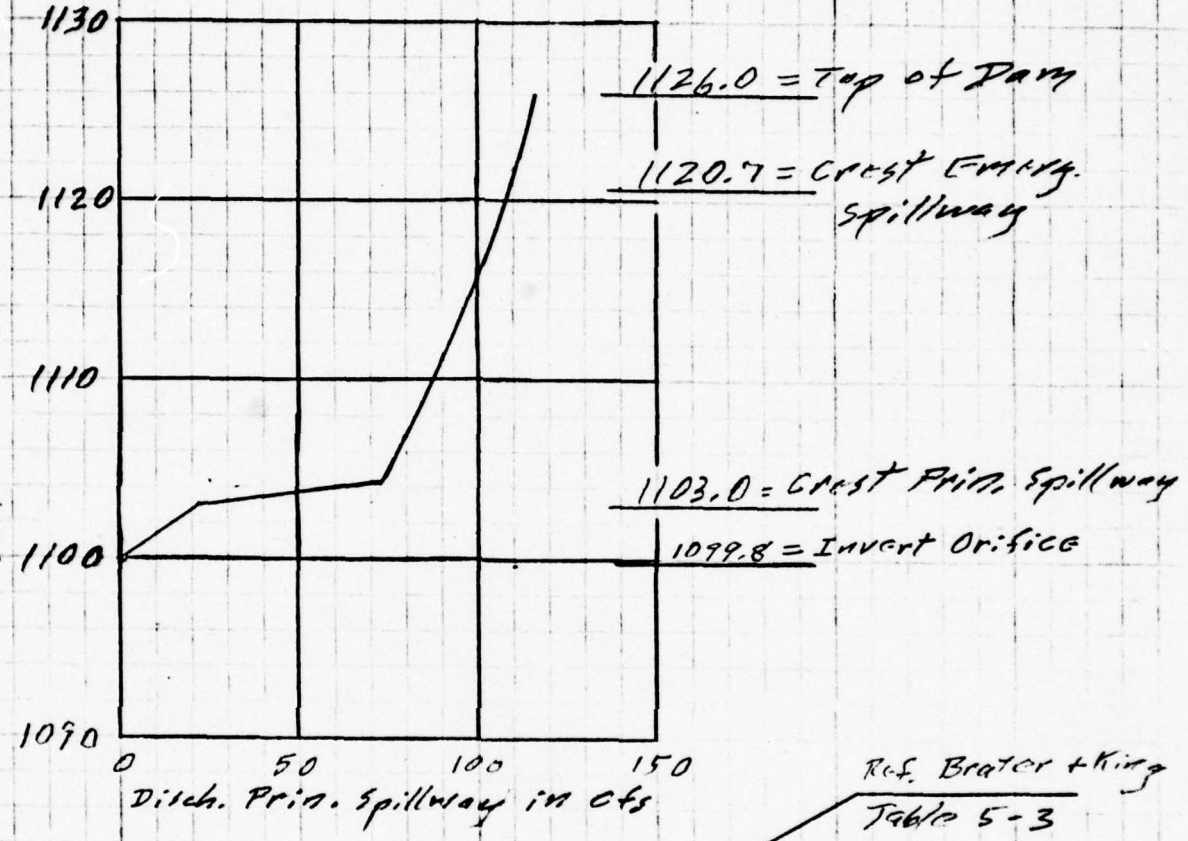
Pipe (80 cfs) $H = [0.2444]\left(\frac{80}{10}\right)^2 = 15.64$

Pool / 80 cfs $= 1089.0 + 1.25 + 0.77 + 15.64 = 1106.7'$

SUBJECT Hoosegock Creek Dam, ID No. 672 SHEET NO.

COMPUTED BY RES DATE May 17, 1979 CHECKED BY JJPL

Principal Spillway - Cont.



Ref. Brater + King Table 5-3

Elev. 1104.0 $Q_{weir} = CLH^{3/2} = 2.84 \times 12 \times (1)^{3/2} = 34.08$.

$Q_{orifice} = 0.6 \times 3\sqrt{64.3 \times (1104 - 1099.8 - .75)}$

$= 26.81$.

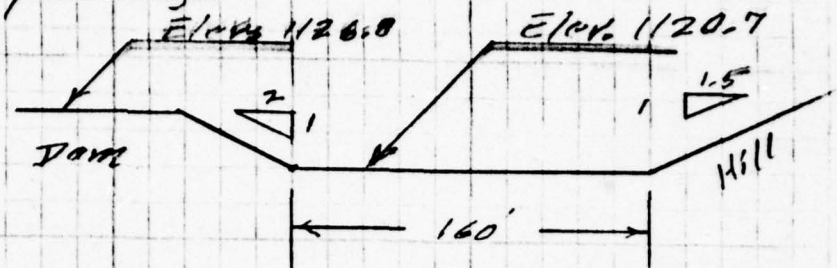
$Q_{Total} = 34.08 + 26.81 = 61$ cfs.

SUBJECT Honeycreek Creek Dam ID No. 611-2 SHEET NO. 8 OF 16

COMPUTED BY RES. DATE 5-14-79 CHECKED BY JAPSr

Dam Discharge Rating Cont.

Emergency Spillway



Spillway is lined with grass Not to scale

Est. Q using $Q = CLH^{3/2}$

$C = 2.6$ Ref Brater + King, Table 5-3

$L = 168$

Top of dam $H = 1126.0 - 1120.7 = 5.3$ ft

$Q = CLH^{3/2} = 2.6 \times 168 \times (5.3)^{3/2} = 5320$ cfs

Prin. Spillway 116

Total 5450.

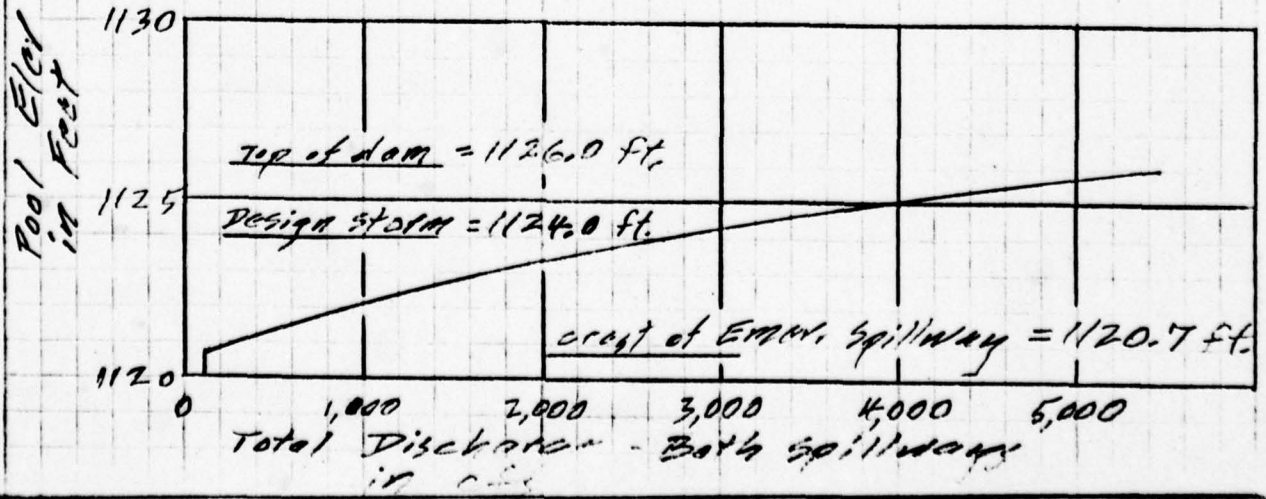
Design Flood outflow Elev. 1124.0

$H = 1124.0 - 1120.7 = 3.3$ ft

$Q = CLH^{3/2} = 2.6 \times 165 \times (3.3)^{3/2} = 2570$ cfs

Prin. Spillway 114

Total 2680.



APPENDIX D

GEOLOGIC REPORT

GEOLOGIC REPORT

Bedrock - Dam and Reservoir

Formation Name: Middle Member, Mauch Chunk Formation.

Lithology: The middle member of the Mauch Chunk Formation consists of mappable units of grayish red to red brown sandstone, with lesser siltstone and shale, alternating with units consisting of grayish red to red brown siltstone and shale with lesser sandstones.

Structure

This dam is located near the axis of the Boston syncline, which trends about East - West. The geology report in the file indicates the beds at the dam strike N70°E and dip 30°SE.

There are no faults mapped at the dam site. Air Photo fracture traces trend N40°W.

Overburden

Nine test pits were dug on the center line of the dam. These pits were eight to nine feet deep. None encountered solid bedrock. On the valley sides weathered red sandstone and shale were encountered. In the valley bottom there was three feet of alluvium composed of clay, silt and sand, over weathered bedrock. The plans indicate that the cutoff trench reached bedrock on the valley sides, but that the center part of the dam is founded in alluvium and weathered bedrock.

Aquifer Characteristics

While some of the sandstone units of the Mauch Chunk Formation may have some primary porosity and permeability, most, if not all, ground water movement is along bedding planes and fractures. Since the grains and cement of the rock are essentially insoluble minerals, there is little chance of decomposition of the rock by ground water movement. The alluvium and weathered bedrock may have permeable streaks which permit freer movement of ground water than the bedrock.

Discussion

Some leakage is possible under the dam foundation through bedrock. If this leakage is not increasing (or does not exist) the foundation is probably reasonably sound.

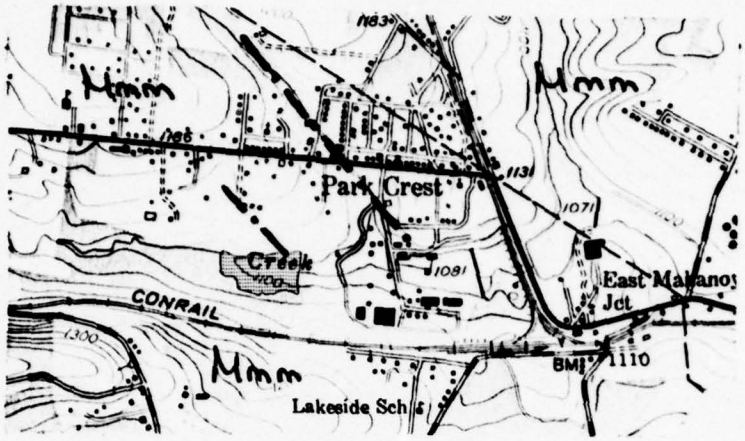
Sources of Information

1. Wood, G.H. and Arndt, H.H. (1973) "Geologic Map of the Delano Quadrangle, Schuylkill County, Pa." U.S. Geological Survey Map GQ 1054.

2. Air Photographs, dated 1968. Scale 1:24,000.

3. Geologic report and test pit logs in file.

GEOLOGIC MAP - Hosensock Creek Dam



(geology from U.S.G.S. Map GQ-1054)

Mmm — Mauch Chunk Fm.- middle member

— · — · — air photo fracture trace

SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

APPENDIX E

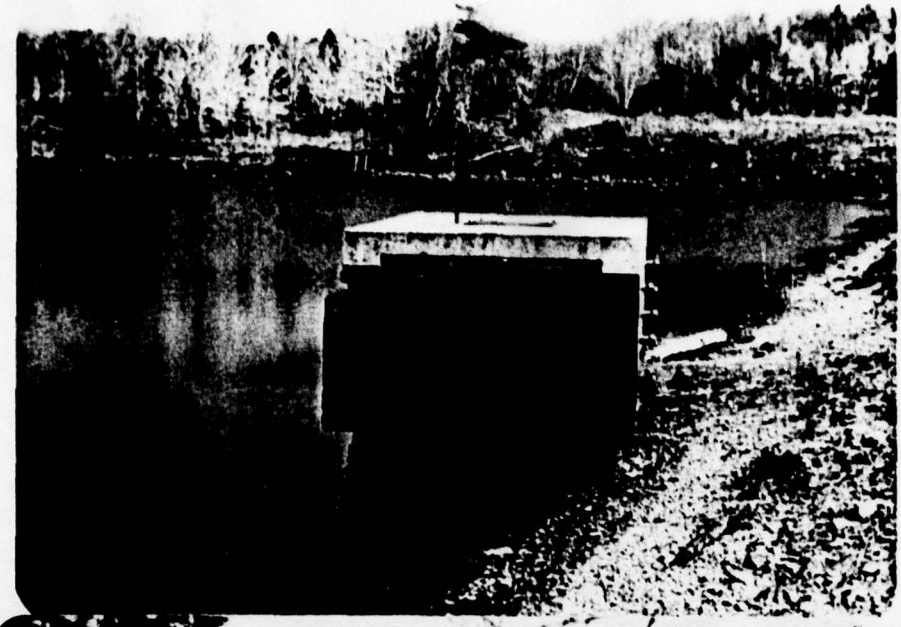
PHOTOGRAPHS

Upstream Slope

Downstream Slope

Downstream Slope
Bike Tracks

PA-672
PLATE E-I



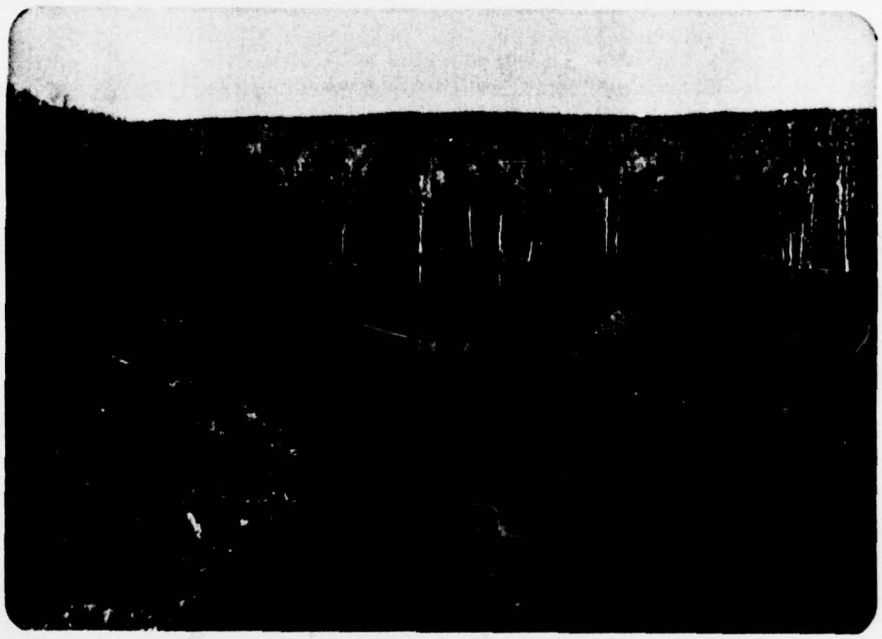
Control Structure
"Riser"

Outlet Pipe

Downstream Channel
Outlet Pipe

PA-672
PLATE E-II

Forebay & Emergency Spillway

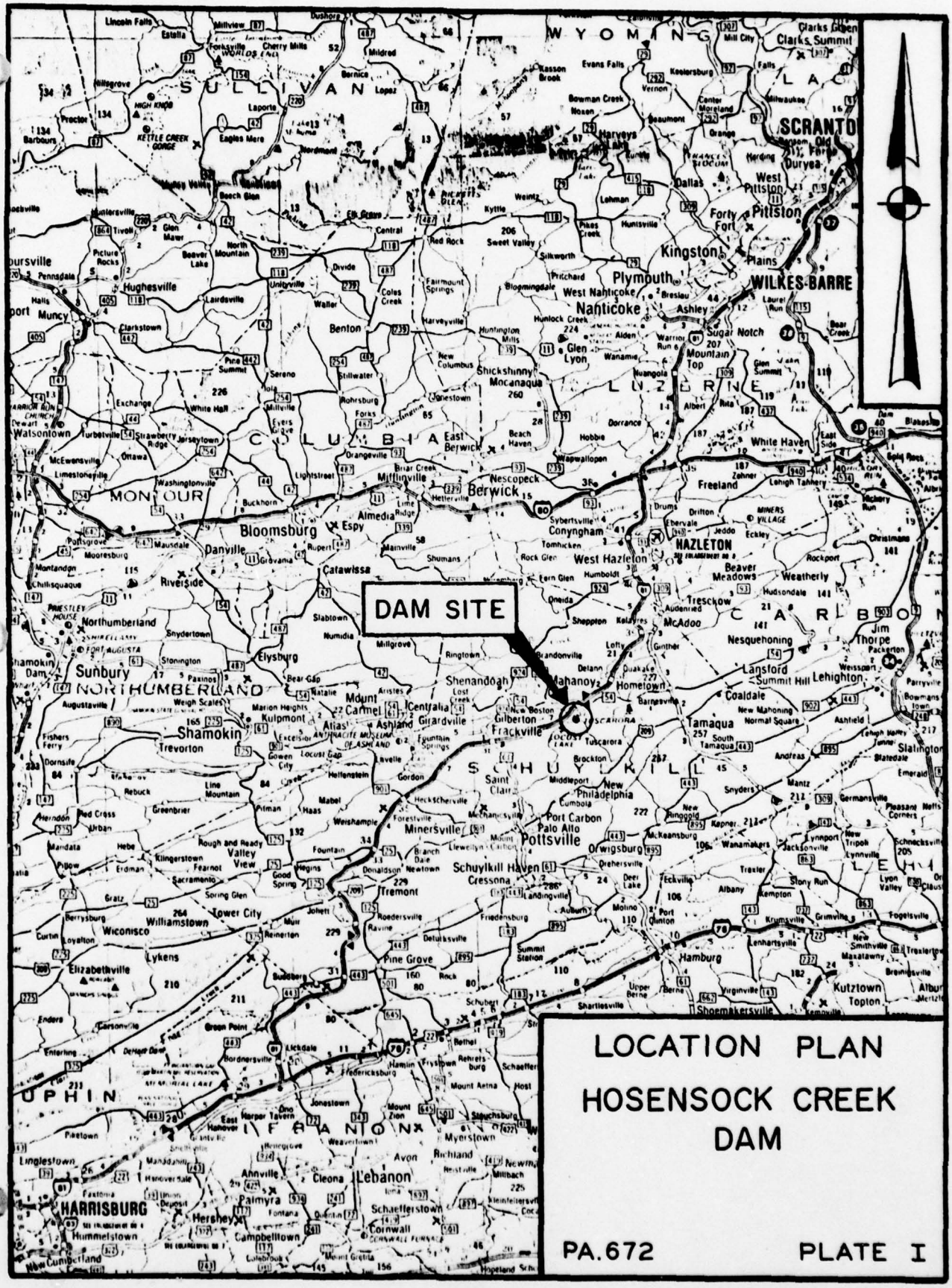


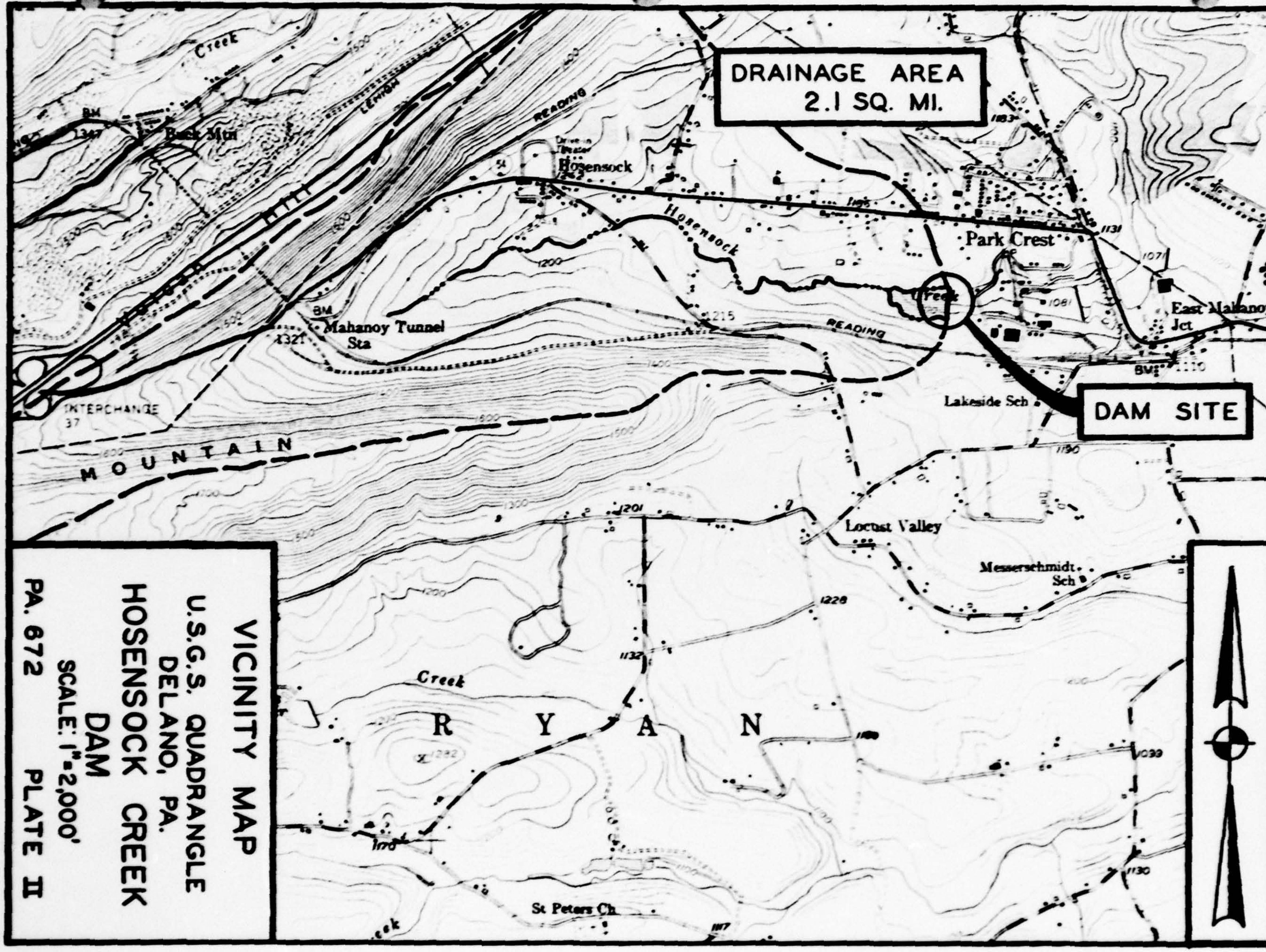
Normal Reservoir

PA-672
PLATE E-III

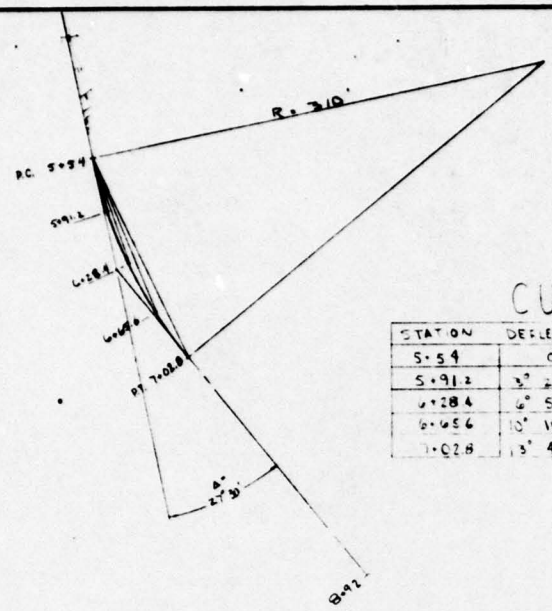
APPENDIX F

PLATES


DAM SITE
LOCATION PLAN
HOSENSOCK CREEK
DAM
PA.672
PLATE I



VICINITY MAP
U.S.G.S. QUADRANGLE
DELANO, PA.
HOSENSOCK CREEK
DAM
SCALE: 1" = 2,000'
PA. 672 PLATE II



MAXIMUM HIGH WATER
ELEV 1124.0'

CURVE II

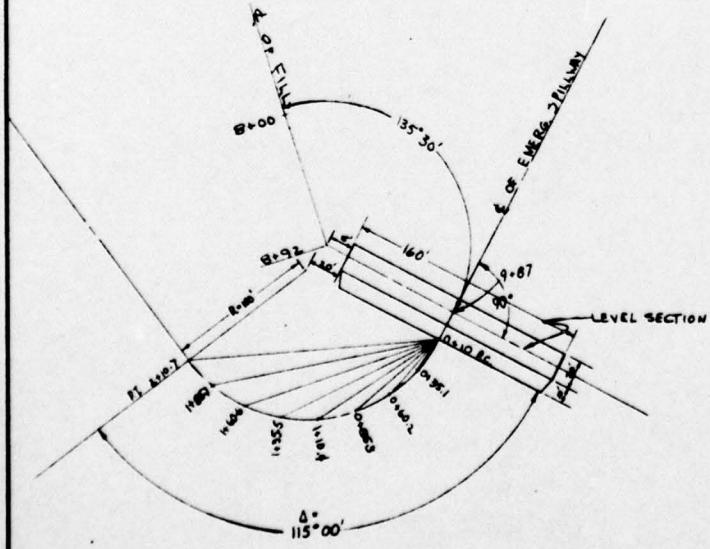
STATION	DEFLECTION	CHORD
5+54	0°	0
5+91.2	3° 24' 15"	37.18
6+28.4	6° 52' 30"	37.18
6+65.6	10° 18' 45"	37.18
7+02.8	13° 45' 00"	37.18

LAYOUT OF ℄ OF DAM - CURVE II

SCALE 1" = 60'

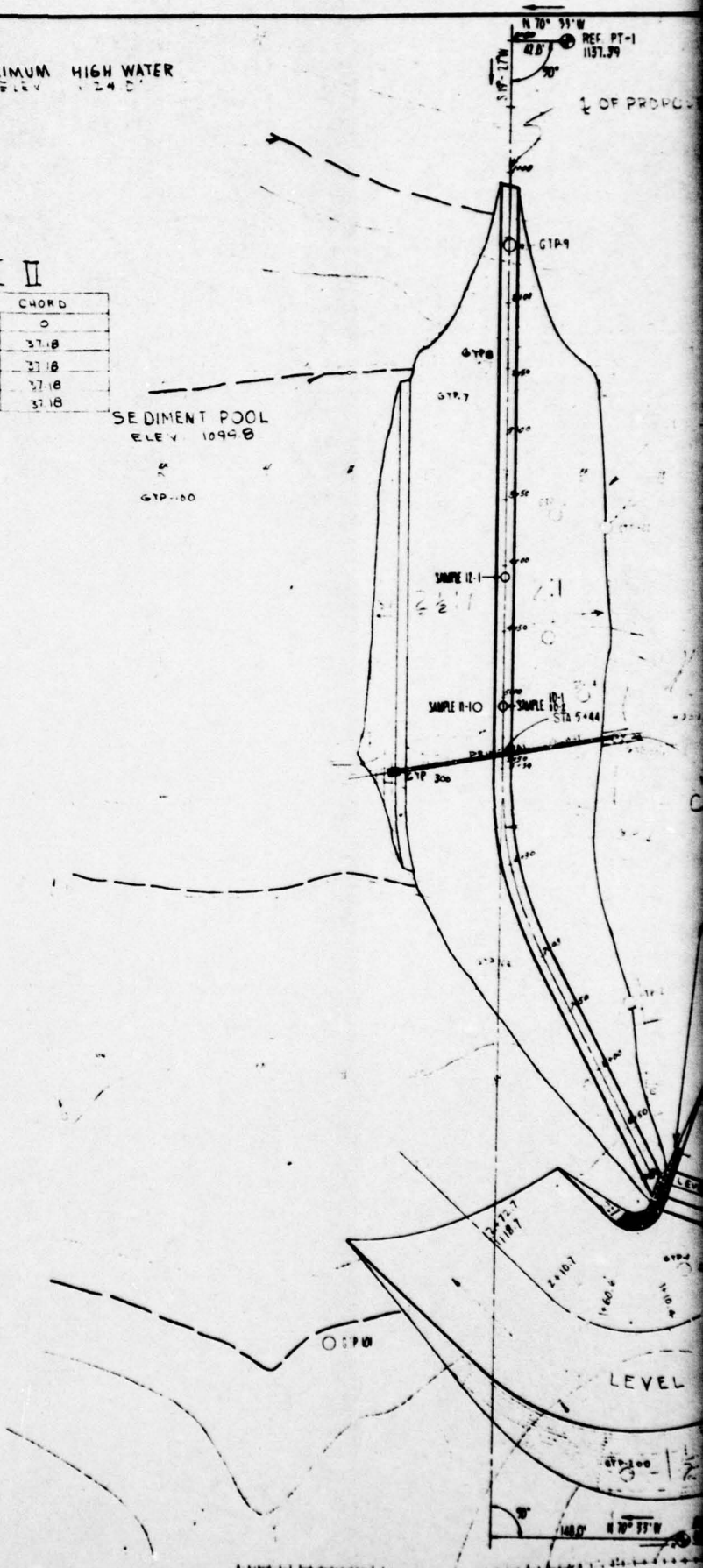
CURVE I

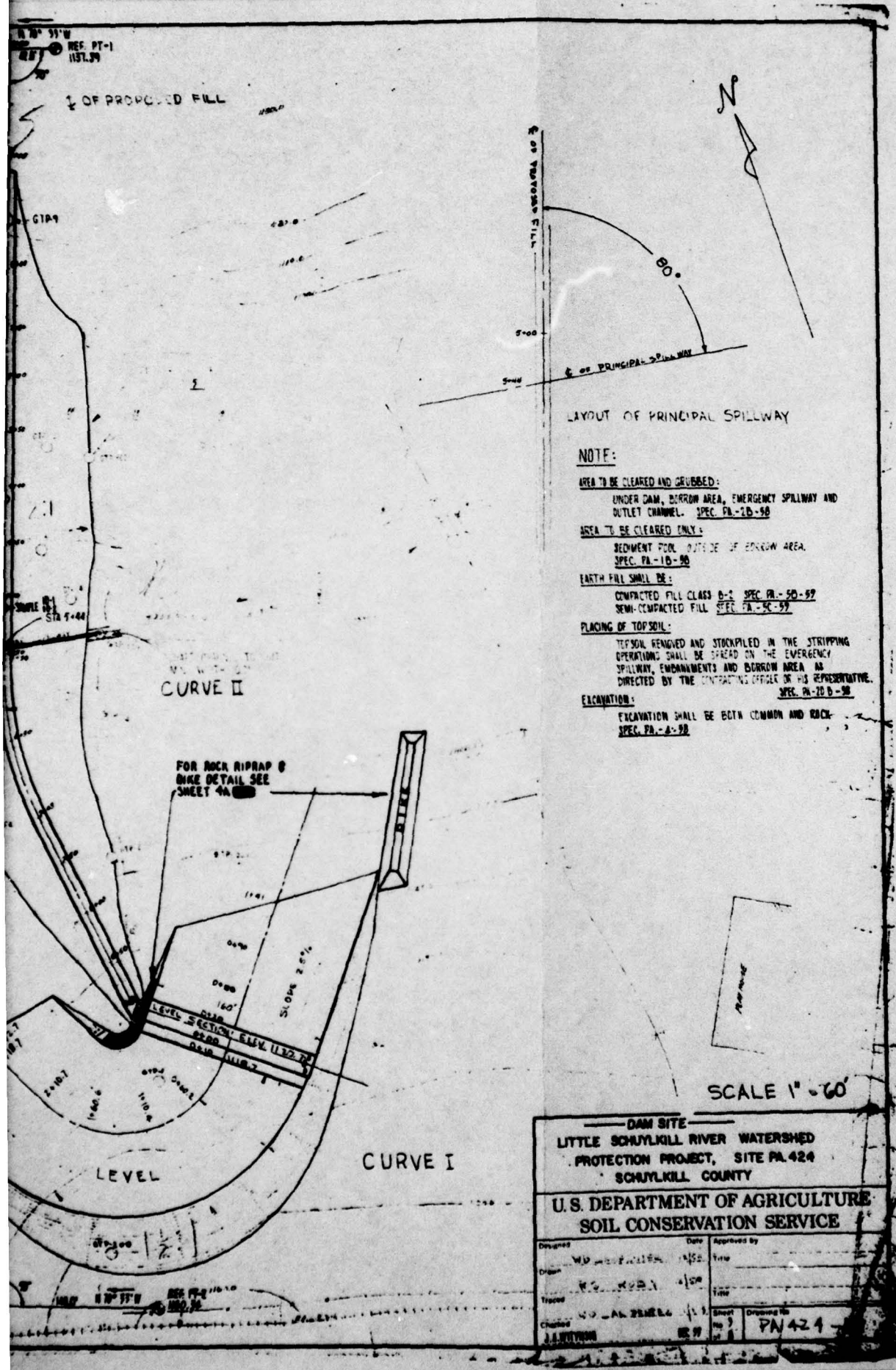
STATION	DEFLECTION	CHORD
0+10	0°	0
0+35.1	7° 11' 15"	25.02
0+60.2	14° 22' 30"	25.02
0+85.3	21° 33' 45"	25.02
1+10.4	28° 45' 00"	25.02
1+35.5	35° 56' 15"	25.02
1+60.6	43° 07' 30"	25.02
1+85.7	50° 18' 45"	25.02
2+10.7	57° 30' 00"	25.02



LAYOUT OF EMERGENCY SPILLWAY - CURVE I

SCALE 1" = 60'





NOTE:

AREA TO BE CLEARED AND GRUBBED:
UNDER DAM, BORROW AREA, EMERGENCY SPILLWAY AND OUTLET CHANNEL. SPEC. PA.-2B-58

AREA TO BE CLEARED ONLY:
SEDIMENT POOL OUTSIDE OF BORROW AREA. SPEC. PA.-1B-58

EARTH FILL SHALL BE:
COMPACTED FILL CLASS B-2 SPEC. PA.-5B-59
SEMI-COMPACTED FILL SPEC. PA.-5C-59

PLACING OF TOPSOIL:
TOPSOIL REMOVED AND STOCKPILED IN THE STRIPPING OPERATIONS SHALL BE SPREAD ON THE EMERGENCY SPILLWAY, EMBANKMENTS AND BORROW AREA AS DIRECTED BY THE CONTRACTING OFFICER OR HIS REPRESENTATIVE. SPEC. PA-20 B-58

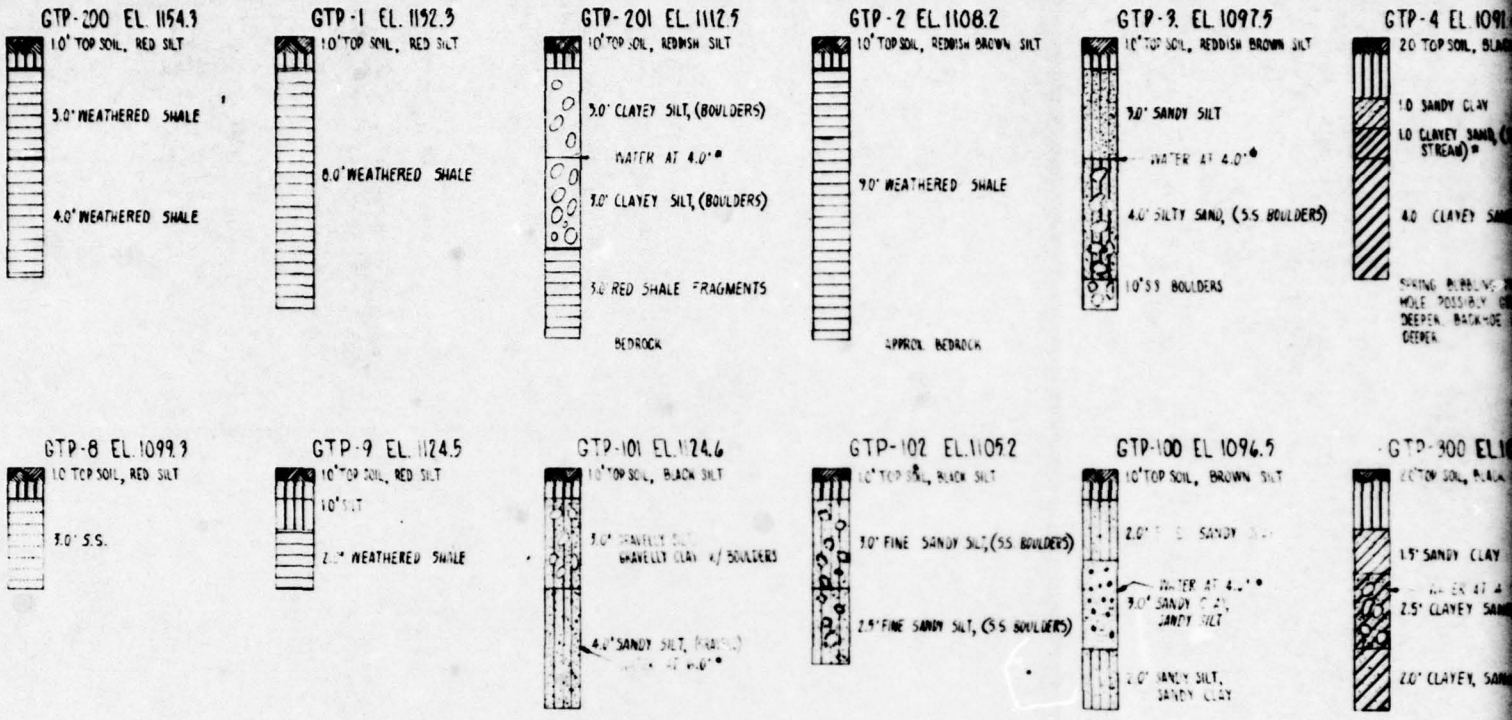
EXCAVATION:
EXCAVATION SHALL BE BOTH COMMON AND ROCK. SPEC. PA.-6-58

DAM SITE
LITTLE SCHUYLKILL RIVER WATERSHED
PROTECTION PROJECT, SITE PA. 424
SCHUYLKILL COUNTY

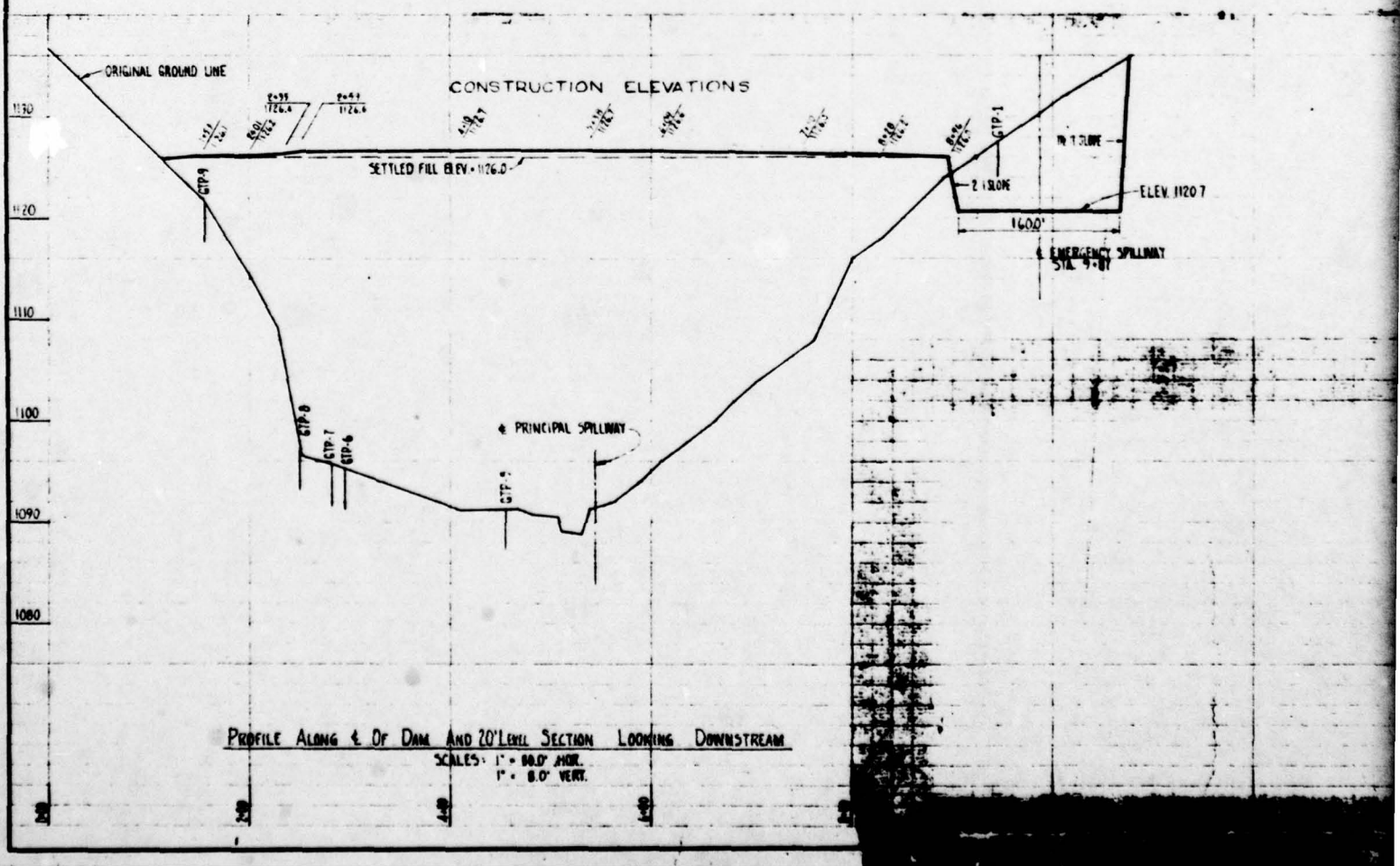
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn		Title
Traced		Title
Checked		Sheet No. 3 of 4 sheets; Drawing No. PA 424-3

PA. 672
PLATE III



DATE OF INVESTIGATION: NOV. 19



EL. 1097.5
REDDISH BROWN SILT
SILT
AT 4.0'
SAND, (5.5 BOULDERS)
BOULDERS

GTP-4 EL. 1091.4
2.0 TOP SOIL, BLACK SILT
1.0 SANDY CLAY
1.0 CLAYEY SAND, (SEEPAGE FROM STREAM)
4.0 CLAYEY SAND
SPRING BUBBLING IN BOTTOM OF HOLE POSSIBLY GRAVEL ZONE DEEPER. BACKHOE COULDN'T GO DEEPER.

GTP-5 EL. 1090.1
1.0 SILT, TOP SOIL, BLACK
2.0 SANDS & GRAVELS, WATER IN THIS ZONE
7.0' SANDY W/CLAY
10' SAND

GTP-6 EL. 1093.0
1.0 RED SHALE (CRUSHED OR HAULED IN TO BASE)
0.5 ORIGINAL TOP SOIL, BLACK SILT
2.0' SILTY CLAY
3.0' SAND & GRAVELS
2.0' SILTY W/SAND

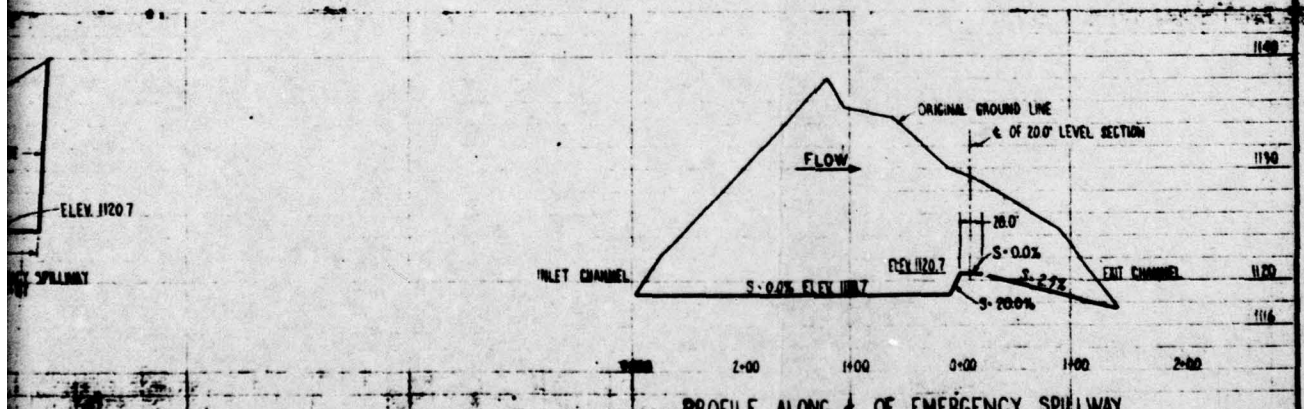
GTP-7 EL. 1098.0
1.0 TOP SOIL, BROWN SILT
2.0' SANDY CLAY
WATER AT 2.0'
3.0' SANDY SILT W/SHALE

EL. 1096.5
BROWN SILT
SANDY
AT 4.0'
SILT
SILT,
CLAY

GTP-300 EL. 1093.2
2.0' TOP SOIL, BLACK SILT
1.5' SANDY CLAY
WATER AT
2.5' CLAYEY SAND, (BOULDERS)
2.0' CLAYEY, SANDY, (GRAVELS)

GTP-301 EL. 1091.6
1.0' TOP SOIL, BLACK SILT
1.0' SANDY CLAY
4.0' SILT (BOULDERS)
4.0' CLAYEY SAND (GRAVEL)
WATER AT 9.0'

GTP-500 EL. 1097.3
1.0' TOP SOIL, RED SILT
2.0' CLAYEY SAND
4.0' SHALE & S.S. BOULDERS
WATER AT 7.0'
9.0' SHALE & SS BOULDERS



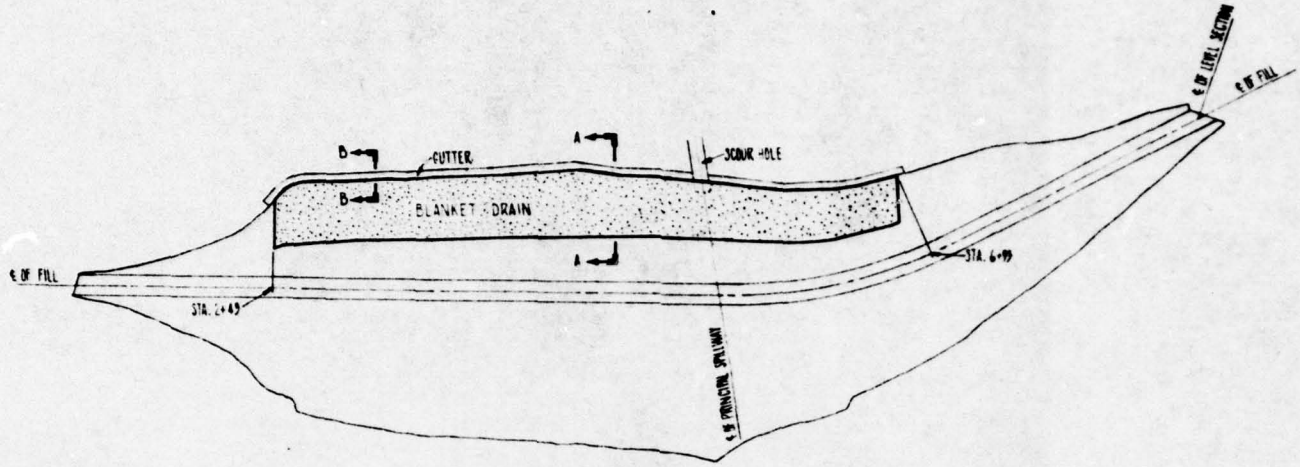
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
SCALE HOR. 1"=50' VERT. 1"=5'

—PROFILES & SOILS INFORMATION—
LITTLE SCHUYLKILL RIVER WATERSHED
PROTECTION PROJECT PA.-424
SCHUYLKILL COUNTY, PA.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

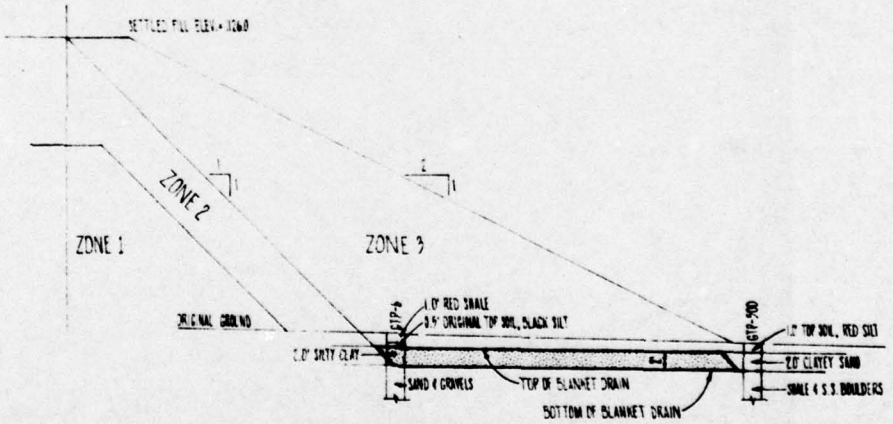
Designed	D.J. SCHEIRE	Apr. 59	Approved by
	W.D. CARPENTER	Dec. 59	Title
Drawn	H.T. BROWNING	Apr. 59	
	R.S. BURY	Dec. 59	Title
Traced			
Checked			Sheet No. 4 of 4 sheets
			Drawing No. PA-424-P

PA. 672
PLATE IV



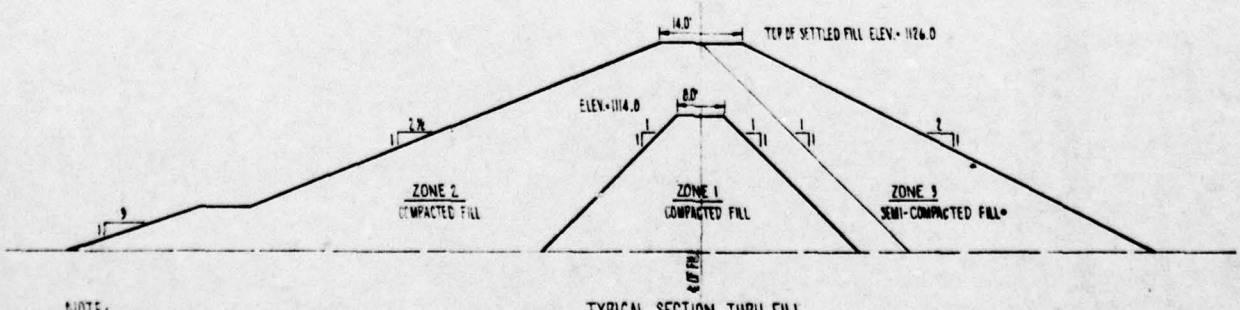
PLAN OF BLANKET DRAIN

SCALE: 1" = 60.0'



SECTION A-A

SCALE: 1" = 10.0'



TYPICAL SECTION THRU FILL

SCALE: 1" = 19.0'

NOTE:

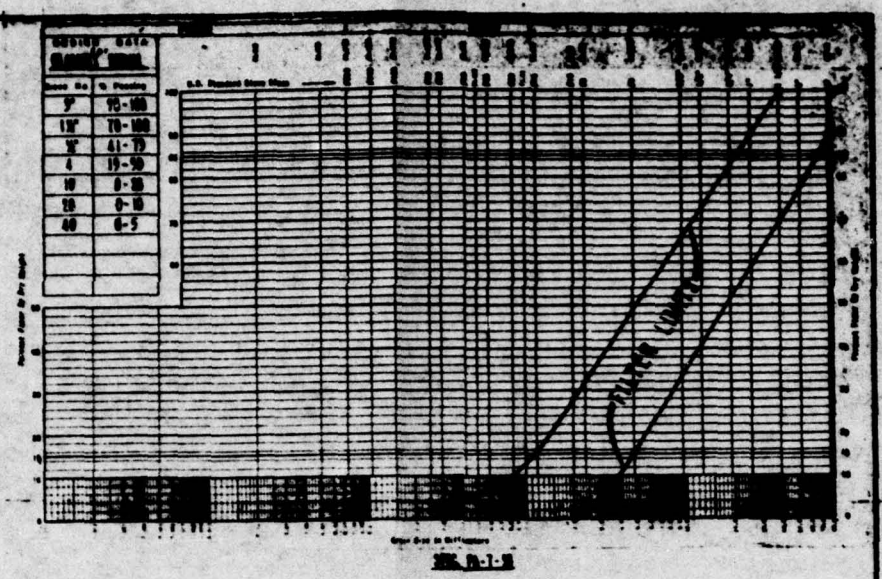
ZONE 1 - INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY.

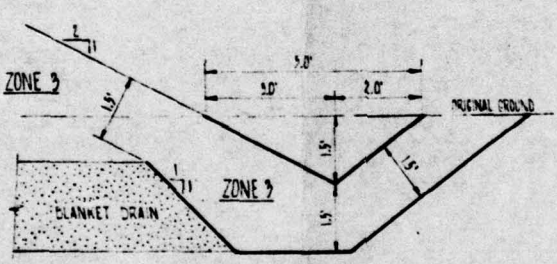
ZONE 2 - MIXTURE OF SILTY SANDS, CLAYEY SANDS, INORGANIC CLAYS & SILTY OR CLAYEY GRAVELS

ZONE 3 - MATERIAL SIMILAR TO THAT EXISTING IN EMERGENCY SPILLWAY.

* SEMI-COMPACTED FILL SHALL BE PLACED IN MAXIMUM 12" LIFTS AND COMPACTED WITH NOT LESS THAN 4 COMPLETE PASSES WITH A 400 mm SHEEPS-FOOT ROLLER.

FINAL PLACEMENT AND PROPORTIONING OF FILL TO BE DETERMINED IN THE FIELD BY THE CONTRACTING OFFICER OR HIS REPRESENTATIVE.





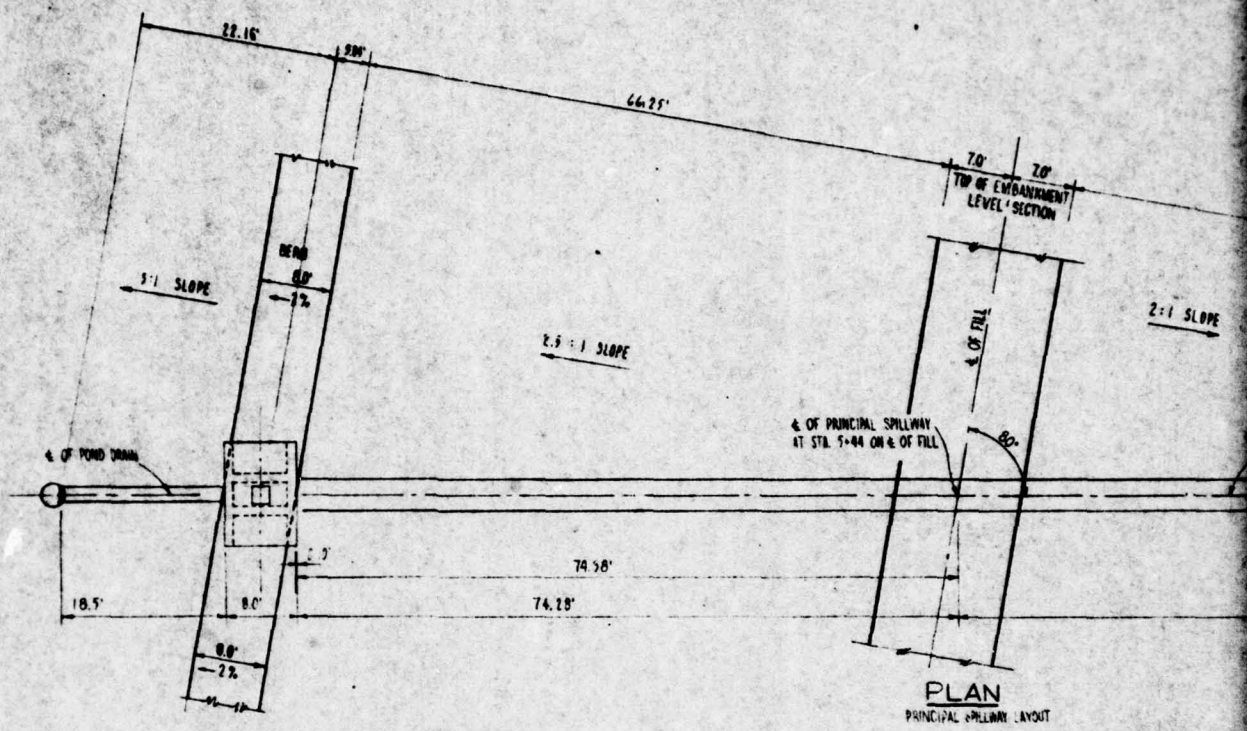
SECTION B-B
GUTTER DETAIL

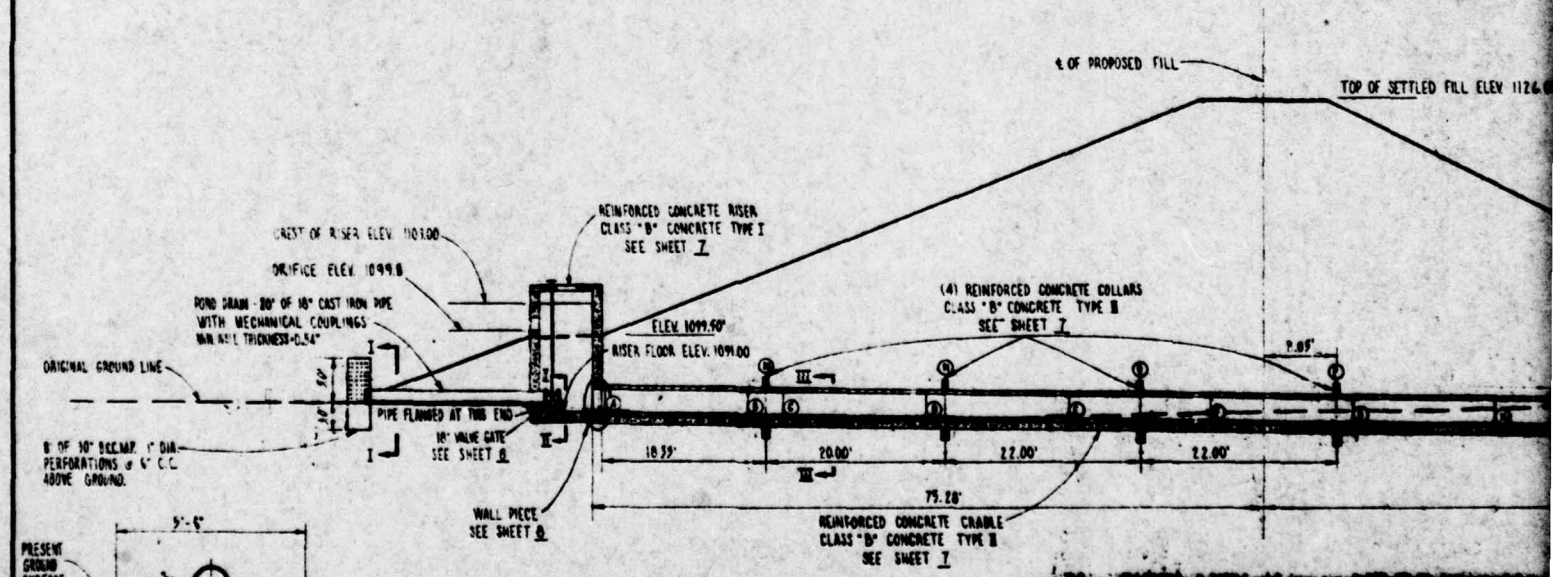
BLANKET DRAIN DETAILS
LITTLE SCHUYLKILL RIVER WATERSHED
PROTECTION PROJECT PA - 424
SCHUYLKILL COUNTY, PA.

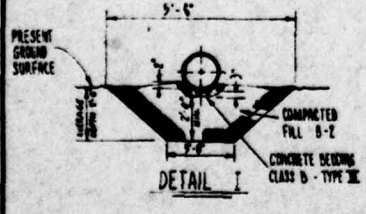
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

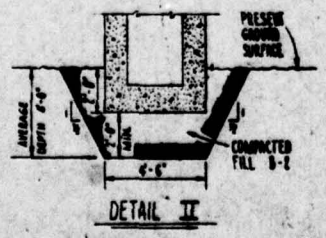
PA - 424 - P

PA. 672
PLATE V



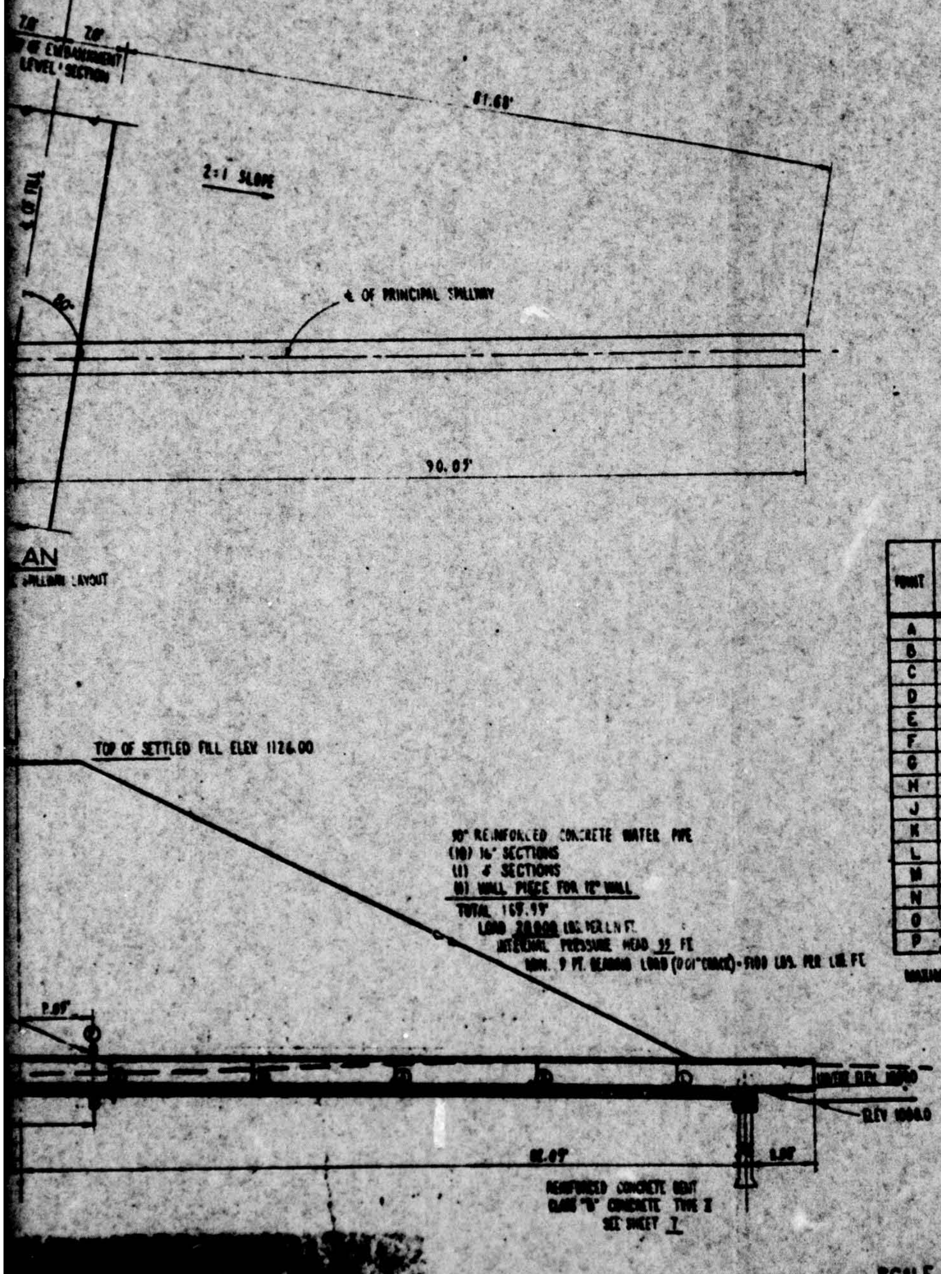






EXCAVATION DETAILS

SCALE: 1/4" = 1'-0"



POINT	DISTANCE FROM DISCHARGE END OF 90" PIPE IN FEET	INVERT ELEVATION OF 90" PIPE WITH CAMBER
A	164.0	1091.0
B	149.0	1090.95
C	144.0	1090.91
D	128.0	[illegible]
E	112.0	1090.79
F	96.0	1090.67
G	80.0	[illegible]
H	64.0	[illegible]
J	48.0	[illegible]
K	32.0	1089.56
L	16.0	1089.28
M	146.0	[illegible]
N	126.0	[illegible]
O	104.0	1090.71
P	82.0	[illegible]

MAXIMUM CAMBER = 0.5' AT POINT F

SCALE 1" = 10'-0"

PROFILE ALONG ℄ PRINCIPAL SPILLWAY
LITTLE SCHUYLKILL RIVER WATERSHED
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SCHUYLKILL COUNTY, PA.

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SOIL CONSERVATION SERVICE

PA. 672
PLATE VI